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# This Week in The IRON AGE

Vol. 153, No. 21

May 25, 1944

## Editorial

Another Inch Toward Freedom ..... 39

## Technical Articles

60 Mm. Mortar Shell Production Technique	42
Automatic Tapper Applied to Heavy Work	44
Steel Separators for Gun Mount Bearings	45
Machining the Barrel for the Light Carbine	46
Radiography Applied to Welding	54
Pneumatic Swagers for Tubing Perfected	58
Radius Broaching of Turbine Buckets	59
Annealing Aircraft Parts in Pan-American Shops	60
New Equipment	62

## Features

News Front	41
Assembly Line	66
Washington	70
West Coast	74
Personals and Obituaries	78
Fatigue Cracks	80
Dear Editor	82
This Industrial Week	84
News of Industry	87

## News and Markets

Civilian Steel Alotments	72
Veteran Rehabilitation Survey	87
Geneva Steel Co. Gets Price Relief	90
"Must" Programs Lag	91
Steel Wage Hearings	92
Foundry and Forge Labor Problems	93
War Contract Termination Plan	96
Machine Tool News	134
Non-Ferrous Metals News and Developments	136
Non-Ferrous Metals Prices; Scrap Prices	137
Iron and Steel Scrap News and Prices	138
Comparison of Prices by Year	140
Finished Iron and Steel Prices	143
NE Steel and Warehouse Prices	144
Semi-Finished and Tool Steel Prices	145
Steel Pipe and Tubing Prices	146
Wire Product Prices	147
Pig Iron and Coke Prices	148
Railroad Material and Stainless Steel Prices	149
Ferroalloy Prices	150

Index to Advertisers ..... 213



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## Another Inch Toward Freedom

OF the four famous freedoms, copyrighted and merchandised by the New Deal but "swiped" from other and more ancient originators, freedom of speech is the most important. Unless you have that, you have nothing. Once it falls down, all the rest of the freedoms topple with it.

Until recent years, America has been, as England still is, the land of freedom of speech. There were no strings on it. One could express his opinion of anyone or anything without the fear of going to jail, providing he couched his expression within the limits of decency and the libel laws. Then Senator Wagner opened his Pandora's box to produce the National Labor Relations Act and to begin the process of taking away freedom of speech from a minority group. Through the instrumentality of the National Labor Relations Board, one class of American citizens was deprived of this traditional liberty. It was just an entering wedge but a wedge has to enter somewhere if it is applied at all and once entered no one can tell how far in it will go.

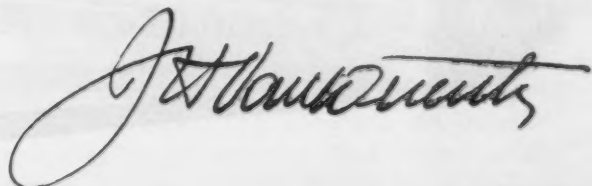
The point of this wedge pierced the freedom of a small minority, which was then politically unpopular and perhaps somewhat in the doghouse in general. This is the historical process of extirpation of rights which can never successfully begin with politically powerful groups or majorities.

Government did not say to Protestants or Catholics or atheists: "It will hereafter be illegal for you to present your views to attempt to make converts." It did not say to labor leaders: "You must not send out to workers in plants letters purporting to come from the President, saying that the President wants you to join the union." Nor did it say to them: "You must not hereafter cast aspersions upon employers, nor can you present to unorganized workers the superlative advantages of paying tribute to you for the right to hold a job."

No indeed, for these things would have been political suicide, not to also say inexpedient.

So the least articulate group in America, the employers, became the target for the entering wedge. They were told: "No matter how good your record has been in the past in respect to labor relations, it shall henceforth be illegal for you to present your case to your employees or to attempt to refute any charges, however unfair, directed at you by professional union organizers. Keep your mouths shut, or go to jail."

It should be gratifying to know that inasmuch as we are so prodigally spending our blood and money to establish the four freedoms broadcast throughout the world, freedom of speech has finally been restored to America. The entering wedge has been removed, not by the Administration that inserted it but by the decision of the Third Circuit Court of Appeals of Philadelphia. From now on, the employer has the same right to free speech as has anybody.



**A TON OF FINISHED  
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*Some job to make  
a ton of steel*

**But America Makes Millions of Tons a Year**



Have at hand—2,800 pounds of iron ore; 16,000 pounds of air; 480,000 pounds of water; 87,000 cubic feet of gas; 1,600 pounds of coal; 825 pounds of limestone; 4,300 pounds of steam; 1,500 pounds of steel scrap—also fluxes, alloys, refractories, electric power, sulphuric acid, muriatic acid, fuel oil, pitch . . . and furnaces capable of developing 27,000,000 B. t. u. for each ton of steel to be shipped.

Making a ton of steel is complex in method and equipment, as well as in the number, and quality of ingredients, supplies and utilities.

At Inland these complex processes are controlled by a large staff of metallurgists working in laboratories and in the plants, and by specially trained engineers who constantly investigate and design new mechanical methods and equipment. Basic ingredients—ore, limestone, coal and fluorspar—come from Inland owned mines and quarries—selected and blended to meet the needs of critical steelmakers. All other supplies are obtained under rigid specifications.

The Inland "know how" for making each ton of steel is giving America quality steels for Victory—later it will help supply the quality steels for America at peace.

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► The Administration's Surplus War Property Administration is heading for Congressional trouble. Principal points of attack are decentralization and lack of any uniform disposal policy.

Congressional criticism is that there will be more than 150 offices throughout the country which will not be operating on uniform procedures and which will undoubtedly conflict from region to region and city to city.

As its contribution to uniformity, the War Department has issued a single standard contract termination form to be used by all its contracting services.

► Britain, like the U. S., is finding some surplus stocks building up in certain industries, but is attacking the problem in a typical realistic manner. A government department has been set up for collecting stocks and storing them in central warehouses. Further manufacture of these products are prohibited and all demands are filled from the warehouses.

This practice follows the British method in the first World War, in which, for instance, Aircraft Disposals, Ltd. took over all aircraft material from the Ministry of Munitions, and gradually released the material in the ensuing years.

► An identical system has been proposed by the Material Section at Wright Field, but so far they have been whistling in the wind. While manufacturers in this country recognize the dangers of heavy surplus stocks, their inclination is to ignore the matter, hoping meanwhile that someone will figure out some inconspicuous method of throwing the material into the ocean.

Less than 5 per cent of value was received from surplus materials sold after the last war. Estimates of current surpluses in this country go as high as \$35 billion, with a rise to \$50 to \$75 billion depending on the length of the war.

► Idle and excess government owned machine tools are not likely to be channeled back into regular production plants through WPB screening. These idle tools will probably be withheld from the regular market and doled out to urgency contract holders of only the most critical variety.

► The North American two-engine, medium bomber, the B-25 Mitchell, an improvement on the plane that bombed Tokyo, is now the most heavily armed airplane in existence. It carries a 75 mm. cannon and 14 .50 cal. machine guns.

► Japanese mineral production essential to steel production during 1943 fell short of quotas according to reports of the Japanese Mines Control Association. Production of iron ore was 89 per cent of the quota; iron sand ore, 60 per cent; chromium, 72 per cent; and tungsten, 94 per cent. Manganese output was 2 per cent over the quota. Overall average in output of "steel ores" was 87 per cent of schedule.

► Two new test beds, capable of taking aircraft motors of up to 5000 hp. and propellers of up to 30 ft. in diameter, have been completed at the Curtiss-Wright Corp. at Caldwell, N. J. An aircraft motor of 2200 hp. is the most powerful unit sensors permit being mentioned in this country.

► The British are getting a little fed up with American advertising. The managing director of Vokes Ltd. recently stated that he was rather tired of Americans claiming to originate everything of major importance. He singled out the Philco Radio Corp. advertisement claiming origination of Radar; and Packard Co., which produces Rolls-Royce Merlin engines under license, claiming that the Hurricane, Lancaster and Mosquito are fitted with Packard Merlin engines.

► Manpower and component shortages have resulted in "must" production losses in at least 220 plants in the Cleveland area. Programs hardest hit are: Farm implements, parts of the aircraft component program, mica, truck parts, trailers, some hand tools, road equipment and railroad needs.

► When X-raying welds, fast film has been found to obliterate welding defects. Fine grained film and carefully controlled darkroom procedures do result in accurate images, introducing no "phony" faults and minimizing no real defects.

► The guaranteed annual wage phase of the steel wage hearing has been termed fantastic. Without guaranty of steel customers, such a plan would be a guaranty of nothing except insolvency, H. W. Boal of Andrews Steel Co. insisted.



# 60 MM. Mortar Shell



• • Blank of steel and finished mortar shell.

By HARRY M. HECKATHORN  
Vice-President, Mullins Mfg. Corp.,  
Youngstown

process on the presses were worked out. A complete set of sample shells was in Washington nine days after the original request was received.

Briefly the process starts with a circular blank of steel 4.503 in. in diameter, 0.670 in. thick, blanked out on a mechanical process from S.A.E. 1010, killed hot rolled steel. A cupping process, three draws and piercing and reducing operations, all performed on mechanical presses, produce a pear-shaped shell, 5.156 in. long, 2.429 in. at the widest point, tapering to 1.980 in. diameter at the larger end and 1.3 in. diameter at the smaller end.

Side walls are about 0.2905 in. thick except at the fuse end where additional metal is built up and at the tail end where the metal is only 0.261 in. thick.

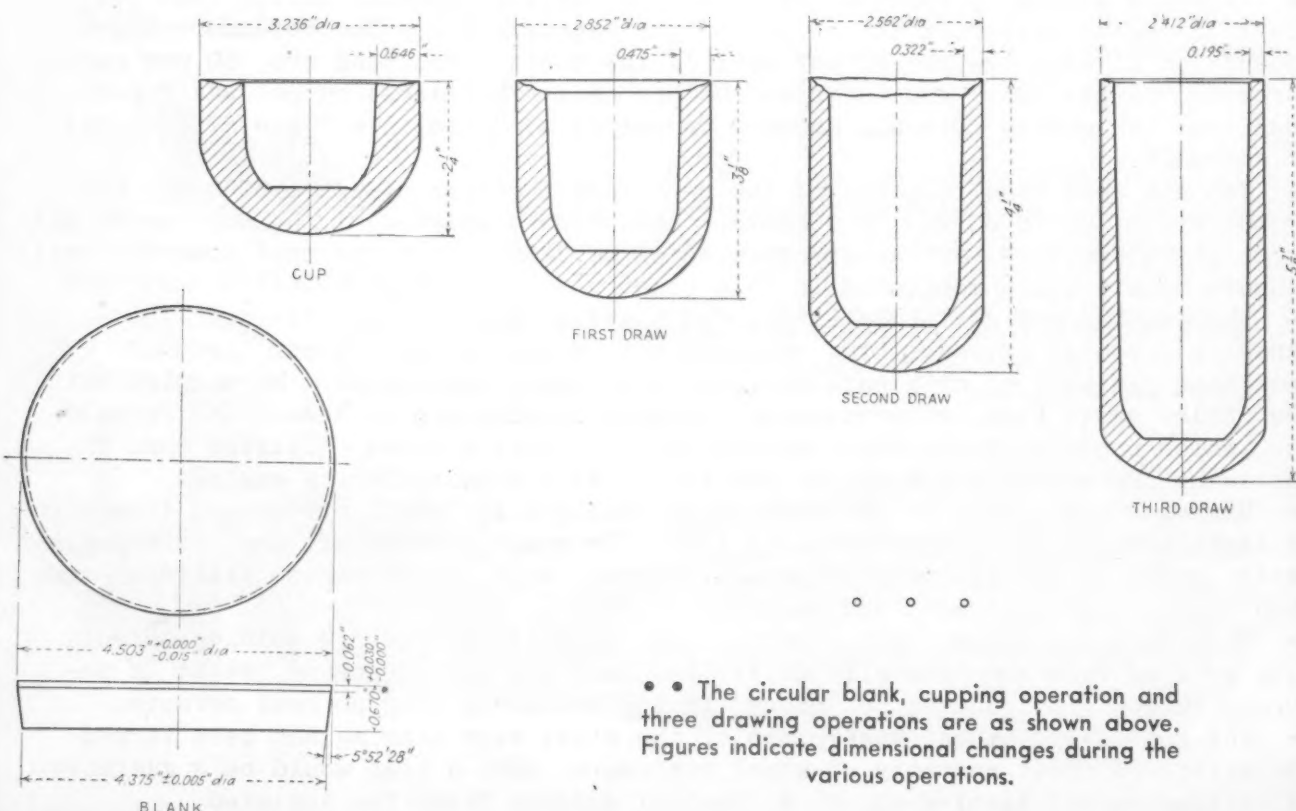
The opening in the tail end, where

MULLINS MANUFACTURING CORP. learned how to make 60 mm. high explosive mortar shells about the same way many persons acquire the art of swimming—the company was literally thrown in and had to learn quickly and without premeditation.

Late in 1943 the War Department notified Mullins that it needed a new method of making mortar shells. They

hoped that a stamping method could be devised in order to avoid forging, machining or casting. One of the best previous methods made use of a rolled blank that was curved on a press to form two halves which were then welded together, but even this had to be improved upon.

Plans were drawn by Jacques Stanitz, William A. Swertfager and the writer, and the final details of the



# Production Technique . . .

the reducing operations take place, is closed with a machined plug 0.762 in. in diameter, 0.750 in. high, with a groove cut near the top around which a silver solder ring fits for brazing the plug to the shell.

Tolerances on outside diameters average 0.020 in., but inside tolerances on the press work must be held to 0.015 in. except at the tail where the hole for the plug is reamed to within 0.004 in. of specifications.

Following is a step-by-step discussion of the process and the equipment involved:

All press operations, including the blanking on a 250-ton press, are done with double dies, producing two pieces at a time. The blanks are then cupped on a 1000-ton press which forms a cup 3.236 in. in diameter, 2¼ in. high with wall thicknesses of 0.645 in. All pieces are washed automatically as they pass through the dies and into conveyor tubes that drop below the press floor. In a washing chamber hot water is sprayed with

**. . . This pressing technique was devised at the Mullins plant in order to avoid forging, machining and casting operations, so that production of 60 mm. mortar shells could rapidly be increased.**

o o o

considerable pressure, removing the lubricating oil used in the draw. Perfect cleaning of all pieces is necessary because in the annealing process that follows nearly every press operation, any oil left on the metal would cause charring and might leave a carbon deposit on the steel that could affect further drawing operations.

Annealing is done in a gas-fired conveyor furnace at 1240 deg. F., and this is followed by a pickling bath to remove scale.

The first, second and third draws which follow the cupping are all performed on the same press. This machine, a 900-ton mechanical unit, holds three sets of double dies, turning out six pieces at a time. Six conveyor tubes carry the pieces through the

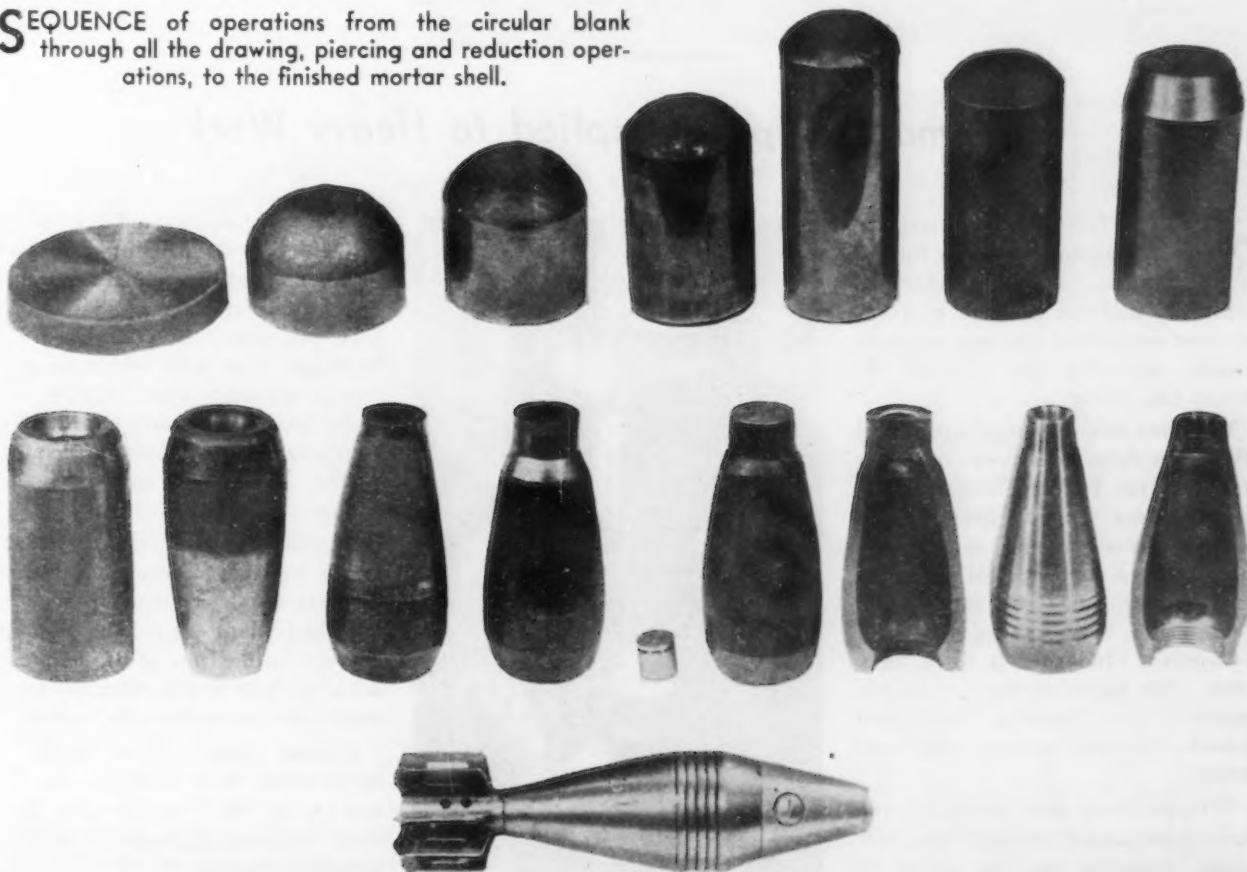
wash chamber and deliver them back up on the press floor where they are packed in the annealing baskets.

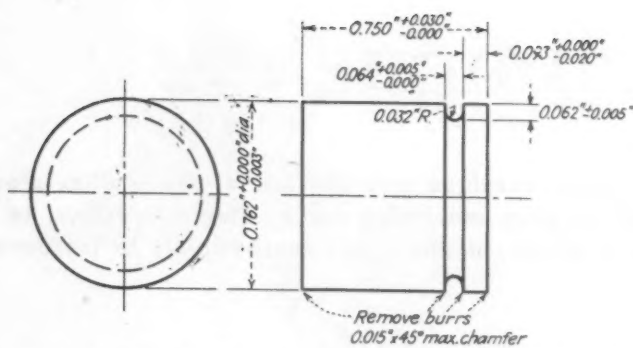
The press has a large bed that once held dies for making pressed steel kitchen sinks. Four to six persons work at one time, loading the dies and an intricate system of controls provides for complete safety.

The three drawings result in a cylinder with a round end approximately 5.75 in. long and 2.50 in. in diameter.

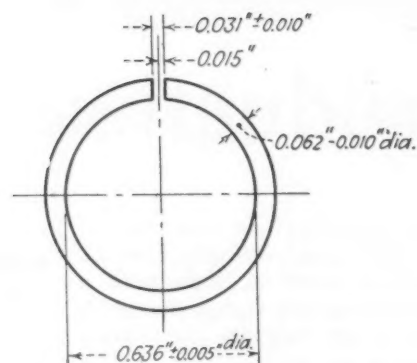
After the third draw the shell is rough trimmed to length in a Reed small piece multi-tool production lathe and is then sent through a pre-heading operation that tapers the corner of the closed end, and work hardens the metal slightly. The end is then pierced in a 250-ton press, with a

**S**QUENCE of operations from the circular blank through all the drawing, piercing and reduction operations, to the finished mortar shell.





**T**AIL plug assembly, showing the dimensions and manufacturing tolerances.



**T**HIS solder ring is purchased from the outside. Silver brazing is carried out in an induction furnace.

tool steel die that produces a hole 1.250 in. in diameter. The metal pierced is slightly under ½ in. thick.

This is the last work done by Mullins on the large end of the shell and from this point on the shell loses its cylindrical shape and begins to approach the pear-shape.

First 2 in. of the open, or unpierced end of the shell is annealed in a Selas, gas-fired conveyor furnace at a temperature of 1100 deg. After pickling, the ends of the shells are reduced, still two at a time, in a 200-ton press that reduces the end from 2.410 in. diameter to 1.500 in. and increases the wall thickness at this point.

The next anneal hits only 1½ in. of the end, and the second reduction on another 200-ton press works the

end to 1.270 in. in diameter. The anneal following this operation is on only the last three-quarters of an inch, leaving the metal above this point slightly work hardened. The end is then put through a restrike operation in a 450-ton press where a flat taper ending in a neck 0.656 in. long, with nearly parallel sides is produced.

The neck thus formed, which is the last of the press operations, is then reamed to receive the plug. Both the plug and the silver solder ring are purchased outside as facilities do not exist at Mullins for producing them.

The solder ring is fitted around the plug by hand and another hand operation fits this assembly into the shell. Silver brazing is done in an induction

furnace until the silver flows by capillary action throughout the entire joint, forming a perfect weld.

Final work includes two testing operations for every piece and one extra test for a specified number in each lot. First is a 150-lb. air pressure test in water to check the brazing of the tail plug. Then a 50-lb. weight at one foot is dropped on the plug as a further check. The specimen test calls for a load of 30,000 lb. applied to the tail plug.

The pieces are then stenciled and packed after final inspection.

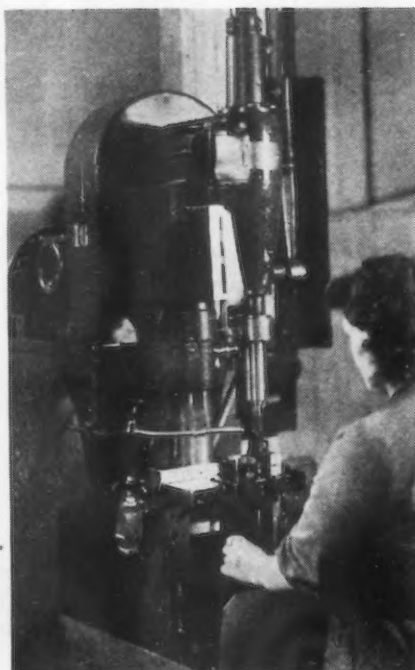
Machining the outsides of the shell and threading the two ends is done elsewhere. The machining operation reduces the rough shell assembly weight from 2.53 lb. to 1.67 lb.

## Automatic Tapper Applied to Heavy Work

**S**UBSTITUTING two vertical automatic tapping machines for one double-spindle, manually operated horizontal machine resulted in a 300 per cent production increase on turnbuckles made by the Edward W. Daniel Co., Cleveland.

The machines now used are Model DB heavy-duty, leadscrew machines manufactured by the Cleveland Tapping Machine Co. and are equipped with a special casting mounted on the column to support a sliding index fixture which holds two turnbuckles. While one is being tapped, the other is inserted. Indexing is by a hand lever. Two machines are operated in tandem, one tapping left-hand threads, the other tapping right-hand threads.

The previously used horizontal machine was tapped through the turnbuckle, dropping the tap out of its



holder to be re-inserted for the next operation. In the present setup the tap is automatically reversed through the hole, saving much time. Tap wear has been considerably decreased, tap breakage has been eliminated and thread accuracy (job requires Class II fit) has been greatly improved, due to leadscrew operation. As many as 10,000 holes per tap have been achieved in the new setup.

Additional advantages are that it is now possible to accurately estimate the time required for a given job and unskilled operators can be employed. The operating time of 16 sec. to tap a 1¼ in. hole in a turnbuckle, for example, can be consistently maintained.

Several sizes of turnbuckle are being made, with holes ⅝, ¾, ⅞, 1 and 1¼ in. dia. They are drop forged steel, representing heavy work for an automatic tapper.



# Steel Separators For Gun Mount Bearings

**S**UBSTITUTION of pressed steel roller separators or retainers for bronze separators has resulted in considerable weight saving in large size thrust and radial bearings made by the Bantam Bearings Division of the Torrington Co. for naval gun mounts. For the 5 in. 38 cal. single gun mount, the weight reduction is 70 per cent and for each mount 224 lb. of critical bronze in the rough casting is saved in the thrust bearing alone. For the radial bearing the saving is not so great percentage-wise, but 112 lb. of bronze in the rough casting is conserved. Similar savings have been achieved on the thrust and clip bearings for the 3 in. 50 cal. gun mount. Generally, a reduction in weight, use of cheaper material and a savings in manhours have also resulted in appreciable cost reductions.

The idea of the possibilities of stamped steel separators had previously been gained by the Bantam Bearings Division's design of separator and retainer for the balls of the 40 mm. Bofors azimuth bearings. Here a cast bronze machined separator weighing 6¾ lb. was replaced by a rolled channel shaped steel retainer

weighing 1¼ lb., which is produced at a fraction of the cost of the original casting. These rings were rolled from flat strip steel, holes perforated for ball pockets and ends welded.

In both the 3-in. and 5-in. gun mounts the thrust bearing separator was made in eight sections, clamped together by radial bolts. Each of the bronze separators was carefully machined and partially enclosed the rollers, which carried the cage weight. In the pressed steel design illus-

trated, the separator is not carried on the rollers, but rides on projecting shoes stamped into the lower plate that contact the raceway. The effort to turn this separator with its rollers in place is considerably less than with the bronze separator. As shown in section CC of Fig. 2, the upper and lower halves are held together by brass rivets with U-shaped spacers separating them.

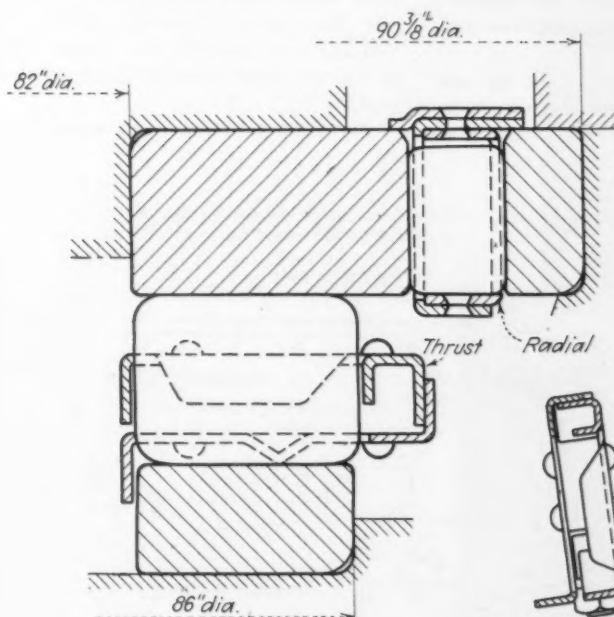
As the rollers are straight, they tend to run tangent to the roll paths of the races and hence flat surfaces



ABOVE

**FIG. 3** — The complete pressed steel thrust separator, about 87 in. in diameter, is made up of eight sections clamped together. Weight is .54 lb., compared with 176 lb. for the machined bronze retainer, made from castings weighing 224 lb.

are provided in the retainers for the outer end as well as both sides of each roller. These surfaces are merely formed lips. Before assembly of the halves of each section, the parts are heavily zinc plated. The steel cage is kept concentric with the race rings by a vertical flange drawn downward from the lower stamping as seen in section BB.

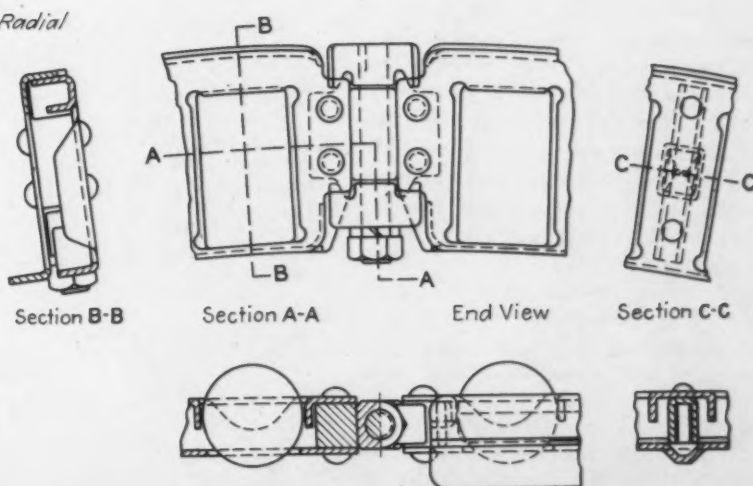


ABOVE

**FIG. 1**—Cross-sectional view of pressed steel separators for the thrust and radial bearings of a 5 in. 38 cal. naval gun mount.

RIGHT

**FIG. 2**—Further details of the pressed steel separator for the thrust bearing of the 5 in. gun mount, showing the method of bolting the sections together.





# For The Light Carbine

the usual soak, quench and draw with the necessary metallurgical control tests. The barrels are brought up to 1550 deg. F., held for 1½ hr. and then quenched in oil. Particular attention has been paid to the quenching operation in order to obtain the desired microstructure for machining. Quenching time is 3½ to 4 min. and the tanks are equipped with program clocks to govern this part of the cycle. Because of the large number of pieces in the basket there was some difficulty encountered at first in getting cool oil into the center of the pile. Following installation of two "Lightnin" propeller type mixers to agitate the quenching oil bath, a marked improvement was immediately noted in the machining operations. Thorough circulation of the oil has done much to eliminate soft, "gummy" centers in

**... Increasing the speed and power of standard machine tools and using carbide tipped tools has resulted in considerable increase in output. Use of carbide drills with high pressure coolant and coarse tooth reamers has helped speed up bore machining, together with broach rifling and automatic chambering operations. For data on the machining of other components of the carbine in other plants, the reader is referred to articles in the April 8 and Aug. 26, 1943, issues of The Iron Age.**

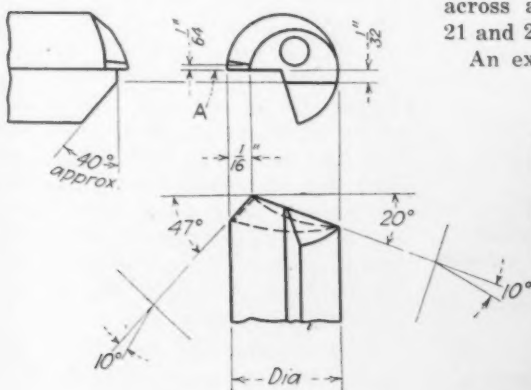
the barrel forgings and produce a better finish in the bore.

The barrels are not allowed to cool below 225 deg. in the quench and are immediately cleaned free of oil in a high temperature cleaning compound and rinsed in boiling water before being put in the draw furnace. The drawing operation consists of bringing the basket of barrel forgings to a heat of 1135 deg. F. for 2 hr., after which a Rockwell hardness test run across a section must read between 21 and 27 "C".

An example of negative rake mill-

ing with carbide tools is found in the first machining operation of facing the end of the barrels in a 24 in. Cincinnati duplex automatic milling machine. An equalizing fixture, Fig. 1, is used which clamps four of the barrels securely during the operation. Carbide tipped end mill cutters are operated dry at 238 ft. per min. with a 4.25 in. table feed. These millers are over 20 years old and flywheels have been added to the arbors to prevent vibration and backlash. Cutter life between grinds is 1400 barrels.

Machining the muzzle end of the



ABOVE

FIG. 3—Grinding instructions for barrel drill with carbide tip.

o o o

RIGHT

FIG. 4—Efficiency in gun drilling with carbide is enhanced by maintaining oil pressure of 500 lb. and over on the drill in this Pratt & Whitney machine.





barrel is another high speed operation. This is turned on a Lipe Carbo lathe using a follow rest and a ball bearing tail stock center. A carbide tipped cutting tool with an 8 deg. front clearance, 4 deg. side clearance, 4 deg. top rake and 12 deg. side edge cutting angle is held in a rigid position with three set screws in a tool holder especially designed for this

operation. The tool shank rests in a slot at a 7 deg. angle for the rough cut. The effective side edge cutting angle thereby becomes 5 deg. on the roughing cut. The lathes operate at high speed (1395 r.p.m.) corresponding to 250 ft. per min., with an 0.010 in. cutting feed and reduce the muzzle from 0.875 to 0.660 in. finish diameter. A coolant using Quaker 18:1 soluble

oil is used on the cutting tool and approximately 300 barrels are turned before the cutting tool is resharpened. When grinding the Kennametal single point lathe tools a guide block is used with the tool to produce the proper angles.

### Drilling with Carbide

One of the most outstanding operations is the method applied to drilling the barrel. Solid carbide deep hole drills, Figs. 2 and 3, are used on Pratt & Whitney double spindle horizontal drilling machines, Fig. 4. Note that the solid carbide blank,  $\frac{7}{8}$  in. long is brazed to a steel drill shank, Fig. 2, which is a few thousandths smaller in diameter. On bores of this small size, no success was obtained with inserted tipped variety of carbide drills which have been used successfully on 20-mm. barrel drilling.<sup>1</sup> Note that when this drill is ground, Fig. 3, the cutting edge is radial but the point of the drill is off center.

<sup>1</sup> See "Cemented Carbide Gun Drills," THE IRON AGE, Aug. 13, 1942.

These P. & W. deep hole drillers normally operate at 1760 r.p.m. but special pulleys are used to gear up the machines to run at the unusual high speed of 3100 r.p.m. Feed is 0.0008 in. and 500 lb. oil pressure is applied so that the drill runs on an oil film which results in low temperature drilling, high penetration and longer life to the drill. Tests have shown that the output could be further increased with 1000 lb. oil pressure applied to the cutting tool, but no coolant pump could be found to stand up against this pressure. The cutting compound used has 4 per cent sulphur and is cutback 50 per cent with a good paraffin oil.

Each machine can drill 7.5 barrels in an hour and one man tends three drilling machines and turns out approximately 372 barrels in 9 hr.

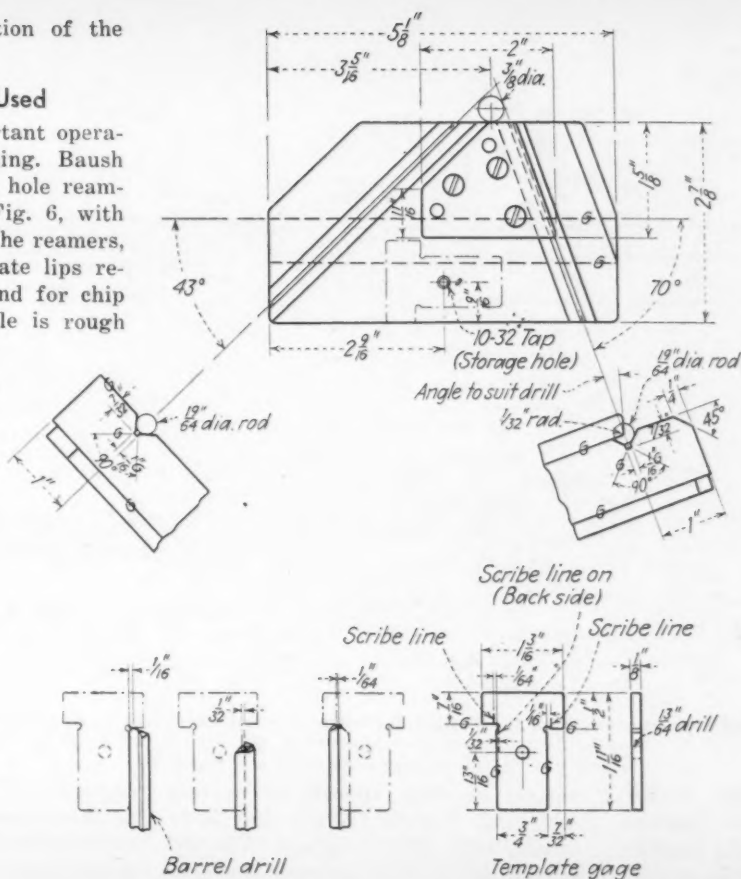
The success of this drilling operation largely depends upon the way the carbide tipped drill is ground, Fig. 3. The operation of grinding the drill is very simple. Only three rotary cuts are required on an ordinary cutter grinder. Resharpening consists of removing approximately 0.010 in. from the face of the drill. A 180 grit diamond finish wheel is used to grind the angles. To prevent the drill from digging in, a  $\frac{1}{64}$  in. flat or, land is ground on the cutting edge of the drill which can be seen in the illustration Fig. 3, at A. For grinding the drills a special fixture was made and is shown at the top of Fig. 5. The gage used to check the angles is

TABLE I  
Operations on Barrel

Operation No.	Operation	Machine
1	Test run-out on rollers and straighten	Foot press
2	Heat treat and draw	Lindberg Super-Cyclone furnace
3	Test for hardness	Rockwell motorized tester
4	Mill to length	Cincinnati duplex miller
5	Center both ends	Double end centering machine
6	Turn muzzle end to full length	Lipe Carbo lathe with follow rest and ball bearing tail stock centers
7	Rough turn breech end, major dia.	Reed-Prentice lathe with ball bearing tail stock centers
8	Rough turn breech end, minor dia.	Reed-Prentice lathe with ball bearing tail stock centers
9	Drill	P. & W. deep hole drill machine (geared up to high speed)
10	First ream	Bausch deep hole reaming machine
11	Re-center	Two-spindle drill press
12	Finish turn breech end—minor dia.	Hendey speed geared head lathe
13	Finish turn muzzle end	Lipe Carbo lathe with follow rest
14	Finish turn breech end—major dia.	Hendey speed geared head lathe
15	Mill both sides of barrel rear end	Cincinnati duplex
16	Mill flat rear and straddle mill gas cylinder lug	No. 2H Milwaukee miller
17	Mill corners a gas cylinder lug	Hand miller
18	Magnaflux, demagnetize and attach	Magnaflux unit
19	Mill track left side	Becker-Brainard miller
20	Mill track right side	Becker-Brainard miller
21	Remove burrs from flats and corners	Belt lap
22	Break corners of operating slide slots	High speed bench grinder
23	Hand mill clearance for slide lug	Hand milling machine
24	Shave clearance in left slide way	
25	Remove yellow tag and finish form top of barrel	No. 1 Sundstrand in Rigidmil
26	Grind muzzle end	Norton 6 x 18 in. plain hydraulic grinder
27	Spline mill front sight key way	Taylor and Fenn spline miller
28	Stamp draw line	
29	Form undercut	Simmons turret lathe
30	Mill threads	Coulter thread milling machine
31	Second ream	Bausch deep hole reaming machine
32	Hand counter sink and rifle	Illinois broach machine
33	Chamber	Krueger chambering machine
34	Hand mill for extractor	Hand milling machine
35	Hand mill clearance for bolt lug	Hand milling machine
36	Drill gas port hole	Special machine
37	Straddle mill gas cylinder lug	Becker-Brainard miller
38	Counterbore gas cylinder hole	Two-spindle drill press
39	Ream out burr from gas port hole	Bench tapping machine
40	Countersink gas cylinder hole	Special Machine
41	Machine tap gas cylinder hole	Haskins tapping machine
42	Cut off surplus material at muzzle end	Becker-Brainard miller
43	Finish muzzle end to length and chamfer	Single-spindle drill press
44	Remove burr from gas port hole inside of barrel	
45	Assemble thread protector and plugs	Bench
46	Sand blast	Sand blasting cabinet
47	Parkerize	
48	Hand tap gas cylinder hole	Bench
49	Hand ream gas cylinder hole	Bench fixture
50	Stamp identification	

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Perhaps the most important operation on the barrel is reaming. Baugh 12 spindle hydraulic deep hole reaming machines are used, Fig. 6, with six fluted push reamers. The reamers, Fig. 7, have three alternate lips relieved 1% in. from the end for chip clearance. The barrel hole is rough reamed to 0.296-0.297 in. and finish reamed to 0.300-0.302 in. in diameter at the unconventional feed of 14 in. per min. This feed is three times faster than generally recommended for this operation and the remarkable feature is that the hole is finished with two reams where it formerly required three and four reams. These feeds have been run as high as 20 in., but there was no gain in production due to down time waiting for the



**FIG. 5**—Fixture used for diamond lapping of the carbide drill point shown in Fig. 3. The angles of 43 and 70 deg. are complementary to the drill point angles of 47 and 20 deg. respectively.

BELOW  
FIG. 6—Battery of 12-spindle Baush barrel reaming machines.



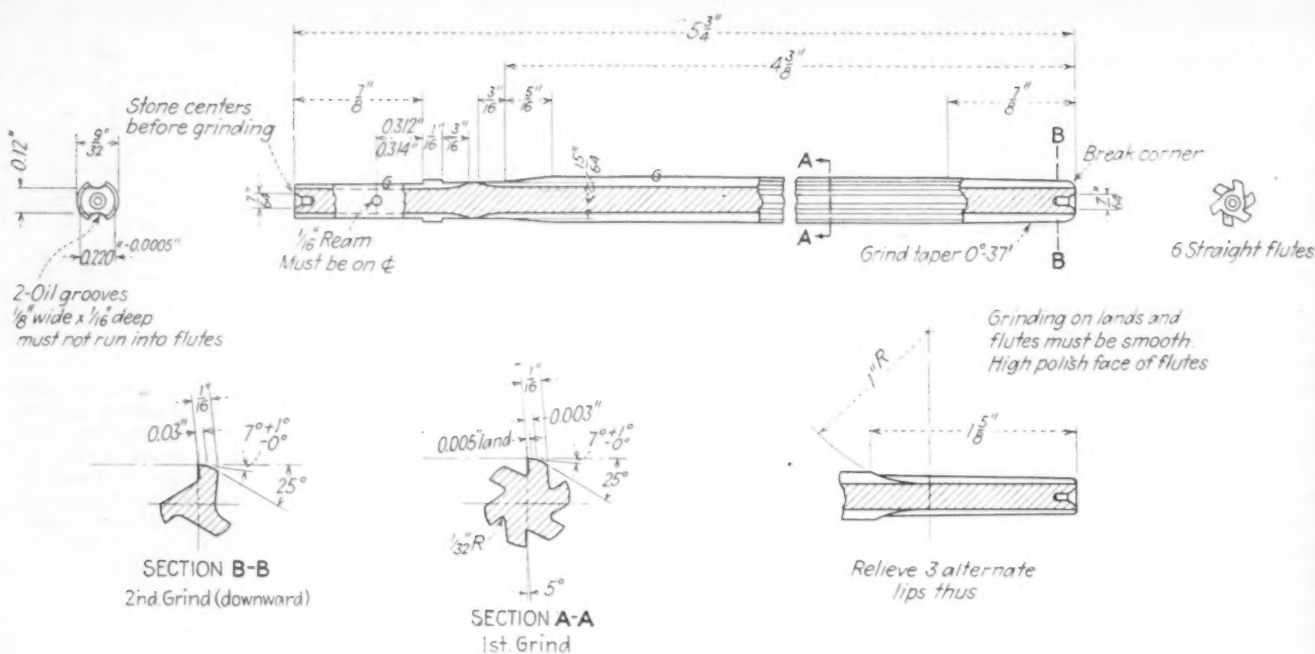


FIG. 7—Details of push type reamer. Half the straight flutes are removed for  $1\frac{1}{8}$  in. to give greater chip clearance.

operator to load and unload. Underwood engineers favor push reaming over the old method of pull reaming because the chips drop out by gravity and are not forced the entire flute length as when the reamer is pulled through. One of the primary functions of the design shown is that the

reamer is long enough to prevent whipping. Lardex (23 per cent lard) is used as a cutting oil and 80 to 100 barrels are reamed between sharpenings.

The muzzle end is finish turned on Reed-Prentice and Hendey lathes using a follow rest and carbide tipped

cutting tools held in holders similar to those used on the rough turning except that the shank slot in the tool holder is at right angles to the work axis. The size of the motors driving these machines was increased in order to double the spindle speeds. In this operation a spindle speed of 1196 r.p.m. is used with a 0.015 in. cutting feed.

FIG. 8—Duplex milling with shell end mills replaces two slab milling operations.



#### Unique Milling Fixture

Both sides of the gas cylinder end of the barrel are straddle milled on a 24 in. Cincinnati duplex machine shown in Fig. 8. An ingenious fixture, Fig. 9, was designed to hold the barrel during the milling operation. The barrel muzzle end is placed on a center at the right end of the fixture and the breech part of the barrel is clamped between vertical equalizing jaws at the left end of the fixture, using the pull rod lever A and cam lock to manipulate and hold the center. The equalizing jaws are clamped and locked through a double cam actuated through lever B. The whole clamp assembly is then rigidly held by the binder clamp lever C. This assures lining up the barrel from the centerline. Angular location is obtained by a work locator shown at D, bearing against the projecting gas cylinder lug on the barrel. The locator is kicked out by a dog and roller at the end of milling operation as shown at E, facilitating unloading. Two shell end mills are used to straddle mill the sides. This method of milling is a decided improvement over the slab milling applied to one side of the barrel at a time, with no relation to the bore of the barrel. At



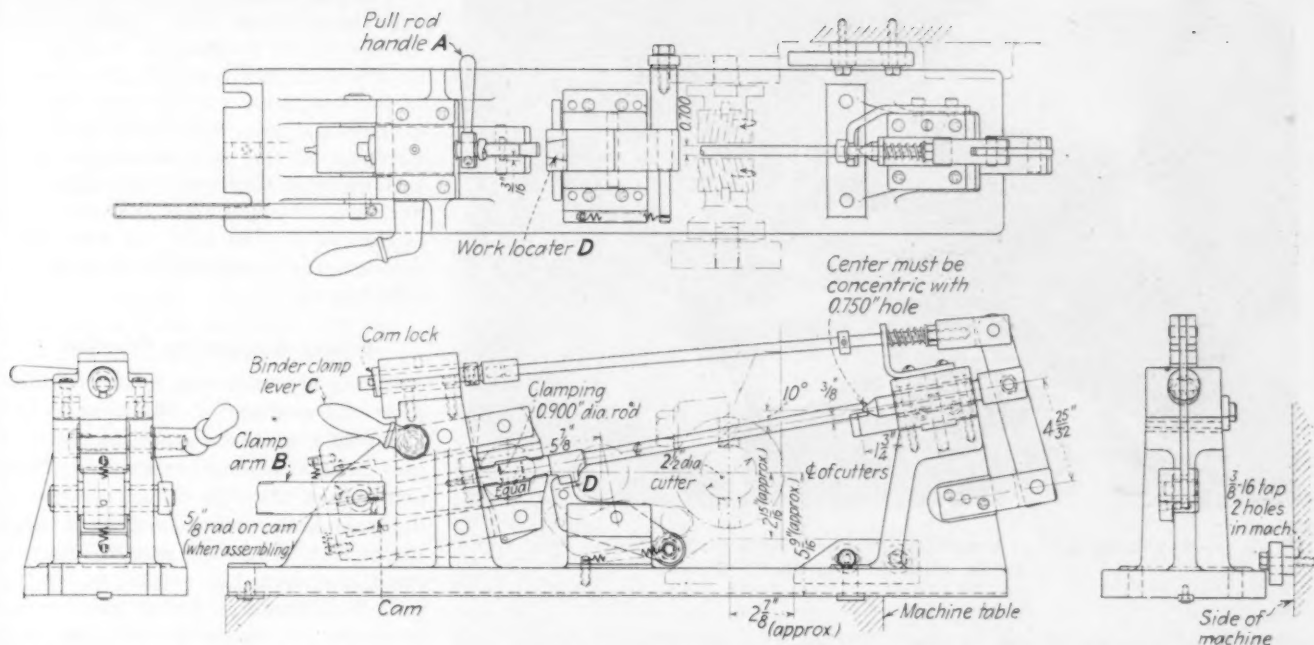


FIG. 9—In this fixture, applied on the miller shown in Fig. 8, the work is located from the bore. At the left, cam actuated jaws clamp the work and are in turn clamped in the fixture frame.

the time this equipment was installed, broaching machines were not available for this type of operation.

The front sight slot or key way is a spline milling operation which is machined on Taylor & Fenn millers. A fixture is used to hold two barrels during the milling operation and the actual production of each machine is 41.4 barrels per hr. A plug gage is used to check the size of the slot, and the position of the slot with relation to center line is limited to a tolerance of  $\pm 15$  min.

The shoulder and undercut on the end of the barrel is a skiving operation, employing a tangential feed tool, and is done on a Simmons micro speed lathe, in which the turret is merely used for supporting the live center. A draw collet is used to hold the barrel in place and a form tool makes the cut. Although the cross slide is operated by hand screw feed, it nevertheless is a very fast operation because depth control is eliminated. It could be made even faster by using a rack and pinion motion.

Coulter thread milling machines are used to mill the threads on the barrel. The threads must be concentric with the bore to within 0.001 in.

### Broach Rifling

Production has also been stepped up on the rifling operation. The complete rifle broaching setup includes Illinois broaching machines,<sup>2</sup> Fig. 10, sharpening machines and inspection fixtures. The broaches, Fig. 11, are made in pairs and two passes are required to rifle a barrel. The broaches are pulled

through the barrel bore and produce their own lead. No exterior devices for turning besides a freely rotating puller are required. The ability of the broaches to follow their own lead is created by the sides of the broach teeth and by helical chip breakers in each tooth.

In the past rifling was done on special machines using a single point tool of correct width and positively controlled helix angle. The criticism of this process was the time expended in finishing a barrel and the necessity

for skilled handling of the tool. Maxi-

<sup>2</sup>"Gun Barrels Rifled by Broaching," THE IRON AGE, June 19, 1941, presents a diagrammatic description of the broaching operation.

mum production with this method was 11 barrels per hr. as against 45 to 50 per hr. at the present time.

With the present method of broaching a cutting lubricant is supplied under high pressure. The pressure is built up in a chamber which is slipped over the broach after the broach has

FIG. 10—Rifle broaching the barrel in an Illinois broaching machine.



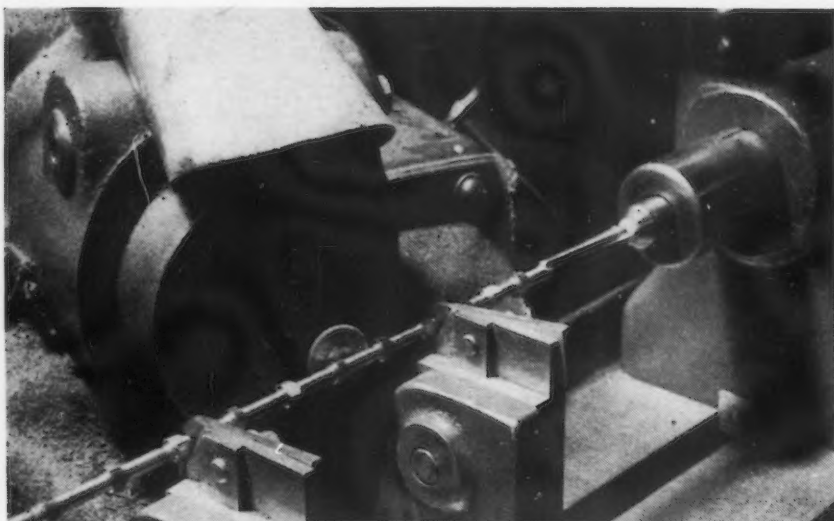


FIG. 11—Regrinding a rifling broach, showing the small diameter grinding wheel used to hollow grind the tooth rake angle.

been inserted into the barrel. Locked into position, the pressure chamber confines the lubricant and forces it over the broach and through the barrel. The construction of the broach facilitates the passage of large amounts of oil. Besides acting as a lubricant and coolant, the oil removes the chips from the cutting edges and accumulates them at the back of the preceding tooth.

In this broaching operation the cut

has to be small enough to cause the chip to roll off in accordion fashion. Heavier cuts would produce more solid chips rolling up in the form of spirals which cannot be accommodated in the long shallow chip space between cutting teeth on the broach. The chip space is purposely made large to avoid crowding the chips since any resistance to the free flow of the chips would be detrimental to the finish and to tool life.

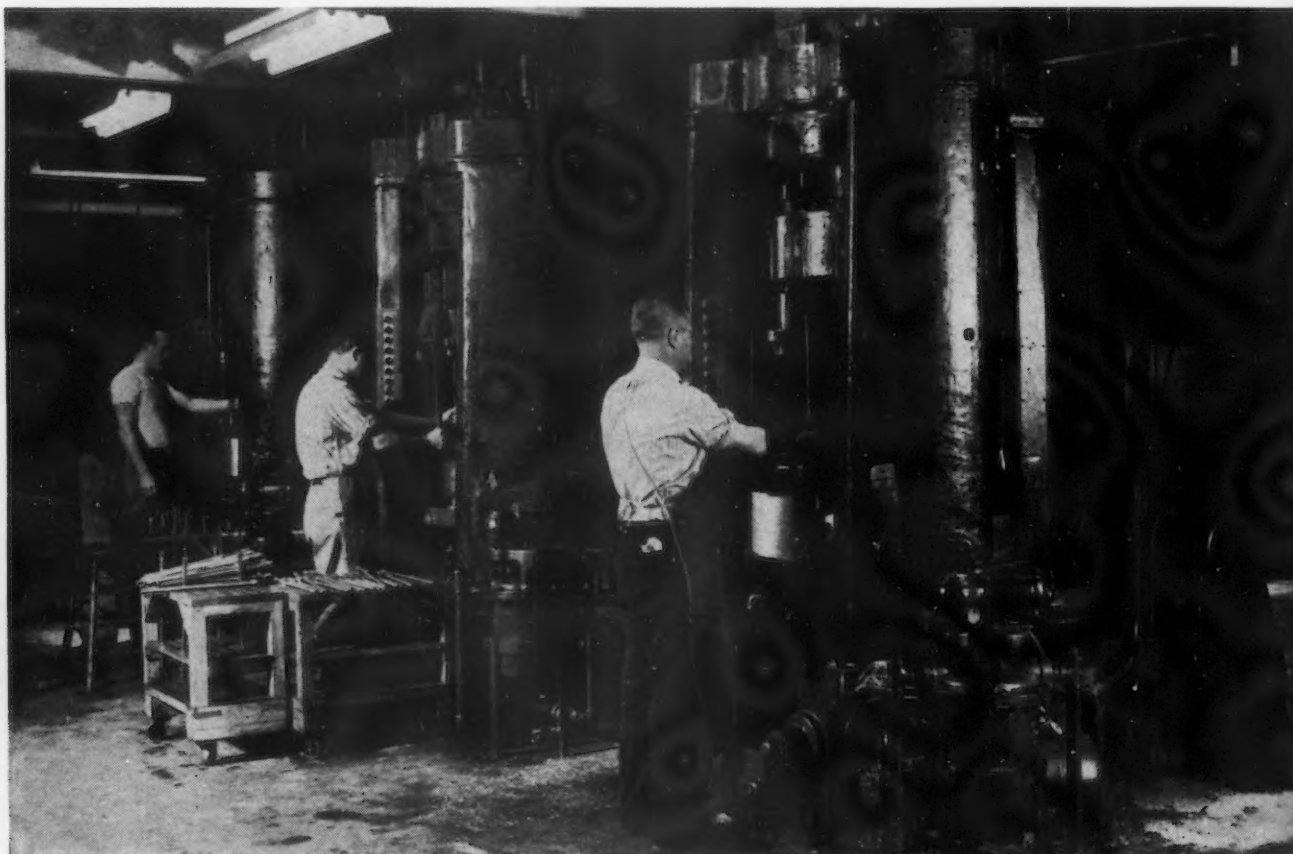
The rifle broaches are made of regular high speed steel, hardened to about 63 to 65 Rockwell C. This hardness is desirable from the standpoint of tool life, since cutting chips 0.0002 to 0.0004 in. thick in alloy steel of the hardness of the carbine barrels subjects the cutting edges to considerable abrasion. Although the broaches are expensive, costing \$290 per pair, the average life is approximately 1600 to 1800 barrels.

#### Broach Sharpening Practice

Rifling broaches require sharpening after an average of 95 passes and about 20 regrinds are possible before the cutters become undersize. The principle of the rifle broach sharpening machine is similar to other broach sharpening machines except that a small diameter, high speed wheel is used to generate a hollow rake surface and is equipped with special steady rests, interchangeable grinding and polishing spindles and a diamond wheel-dressing device. It also has means for quick indexing from tooth to tooth.

The rifling broach inspection fixture which is part of the broaching setup, provides for visual inspection through a microscope of 20 times enlargement. The size and steps of the broach teeth are checked by a snap

FIG. 12—Battery of Krueger automatic chambering machines.



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gage indicator arrangement. Visual inspection of the broaches determines if they have remained free from pick-up. Inspection follows every sharpening to ascertain that every trace of dullness has been removed. Sharpened broaches must be checked on the diameter as well as on the face of the teeth.

For the chambering operations, Krueger multiple spindle automatic machines, Fig. 12, are used. The machine has a loading station and nine different tools complete the operation. Boring tools for the chamber are positioned at five stations; three reaming and one burnishing operation complete the chambering cycle. In these vertical machines, the tools are stationary and are fed upward by combined mechanical and hydraulic actuation. Work is rotated and is indexed from one work station to another about a vertical column. Each machine is geared to chamber 112 barrels per hr.

A special machine, Fig. 13, for drilling the gas port hole was designed in which three Delta drill heads are used. The machine has one loading station and three drilling positions and requires three successive steps to drill two different size holes. A fixture is used to hold the barrel so that the hole can be drilled at an angle of 40 deg. This machine is a decided improvement over the two-spindle drill press formerly used for this operation. A similar unit has been devised for reaming and bottoming these holes, the concentricity between which is held within 0.001 in., with a tolerance on the diameter of 0.0005 in.

The gas cylinder hole is machine tapped on a Haskins pneumatic tapping unit. The tap used has a pitch  $+0.0026$  diameter of 0.4797 and must  $-0.003$

be concentric with the bore to within 0.001 in. A fixture is used to hold the barrel during the operation and each machine can tap approximately 75 barrels in an hour.

In conclusion, attention is called to the operation for crowning or muzzling the end of the barrel. This was originally considered a lathe operation and was performed that way. By application of special jig and tools this operation has been put on a drill press, Fig. 14, and production boosted to 185 barrels per hr. This type of operation is very important in that if the crowning is not done concentric with the bore, a wild shooting barrel



FIG. 13—These four Delta drill heads have been arranged in this special unit for step drilling concentric gas port holes of two diameters.

will result. The drill press method used at Underwood proved to give as good or perhaps a better quality of barrel as regards this operation as was possible with the old lathe method and much faster.

FIG. 14—Improved drill press setup for crowning the barrels does a better and faster job than the former lathe operation.





# Radiography Applied to

AS with several other methods of fabrication, the reliability of the products of the welding industry depends on personal skill as well as on other variables. The surface appearance of a weld will give a lot of information, but it does not tell all. On any job it is necessary for the welder to establish and to maintain the complete confidence of his customer. In establishing this confidence, the opposition of those favoring more traditional methods of fabrication may have to be overcome. Some people will often refer to isolated cases of the failure of welded assemblies and use them to undermine confidence in the welding method. However, by introducing X-rays the welder can guarantee a job that is above suspicion.

One of the main functions of radiographers is to help create the greatest possible confidence in welding. The reason for the existence of all testing procedures is to prove that materials are what they are represented to be. It is natural, therefore, that X-rays should be used to prove to the purchaser of a welded product that the welding is of the quality called for.

It is for the radiographer to see that whatever has been written into the contract is fulfilled. In general this function is covered by written codes and specifications, such as the A.S.M.E. boiler code. However, no written codes are more than a general guide and the radiographer must have a knowledge of welding and of the function of the welded article before he can interpret these codes reasonably. By the same token, it helps a great deal if the welding engineer knows something of radiography. For instance, it is of considerable benefit if the welder understands the advantages of a good radiograph over a poor radiograph and knows where and when X-ray can be used most effectively.

## Practical Aspects of Radiography

Radiography is a method of producing on a film a picture of the internal structures of an opaque object. In welding, the opaque object consists of the weld metal and the base metal adjacent to it. The factors that matter most are:

1—What can be made visible on the

film? What things can give visible images?

- 2—How can these images be identified and described so that the engineer will know their importance, cause and cure?
- 3—What action should be taken when the image has been identified?

It is often said that a radiograph is just a shadowgraph, but this is not a very good analogy. When a hand is placed between a light and a screen a black and white image is obtained, but the shadow obtained from a thick hand is no blacker than the shadow of a thin one. However, if a hand is placed between an X-ray tube and a fluorescent screen, the bone is clearly distinguished from the flesh, and the thin sections are distinguished from the thick. The powers to let through or to stop X-rays depends both on the nature of the material and on the thickness of the material. The reason that bone can be revealed inside flesh, is that the power of the bone to stop X-rays is much greater than that of the flesh. In technical language, the absorption of the bone is much greater than the absorption of the flesh.

In X-raying a weld, the weld bead is usually thicker than the base plate and for this reason it casts a visible image. If there is a cavity in the weld, there is a local reduction in thickness and so it can cast an image. In the case of an inclusion, an image can be cast if *and only if* the absorption of the included material is different from that of the steel. It is because slag has less power to absorb X-rays than a corresponding thickness of steel that slag inclusions can be revealed. When a metal is fastened to a different metal such as copper brazed to iron, X-rays can reveal how far the one metal diffuses into the other. Unfortunately in the welding of steel to steel there is seldom sufficient difference in the composition of the plate and the rod to allow X-rays to show diffusion.

Anything in a weld that gives rise to a difference in X-ray absorption is capable of producing an image on a screen or on a film. In welds these things include porosity, slag, cracks,

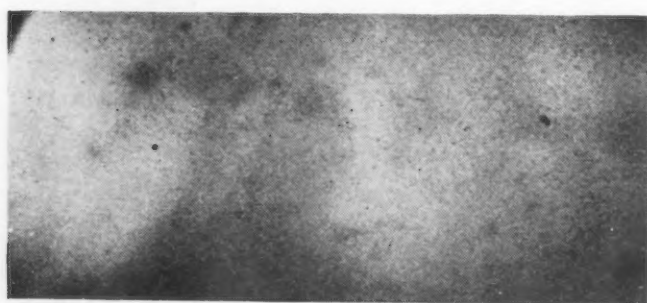


FIG. 1 — Radiograph of a thick weld. Porosity is indicated by black dots.

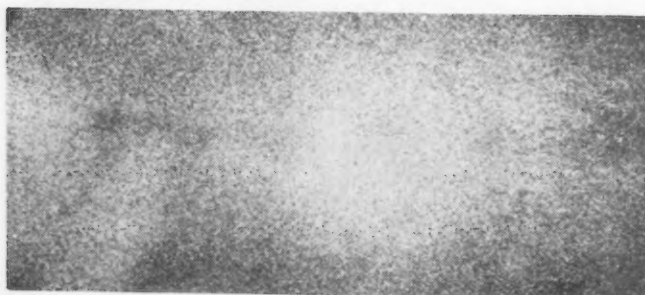


FIG. 2 — Radiograph of precisely the same area shown in Fig. 1, but made on a coarse grain film. Porosity dots obliterated by graininess of film.

# to Welding . . .

By LESLIE W. BALL

Assistant Technical Director, Triplett & Barton, Inc., Burbank, Cal.

lack of fusion, inclusions and undercut. However, whether they are revealed or not depends to a tremendous degree on the X-ray equipment and on the technique. In all probability many welding engineers do not realize how much valuable information is lost by technical factors that may appear to them to be quite trivial.

## Technical Factors

One of the principle features of welding defects is that they are all relatively small and in many cases their images consist of fine lines or small spots. Welding engineers continually demand the use of the fastest available films, not realizing that on a fast film the inevitable coarse grain obscures many defects. If intensifying screens are used, the grain of the screen likewise will limit the results obtained. Fig. 1 has been chosen to illustrate this technical factor. This is a reproduction of a small area of a weld containing some porosity. The black dots are the images of the cavities. A rather fine grain film was used.

Fig. 2 shows precisely the same area of the weld radiographed in the same way, but using a popular brand of fast film. The porosity is almost invisible on this film. An X-ray picture of the microshrinkage defect that is common in magnesium castings is shown in Fig. 3. The original picture was magnified 50 times. The black network consists of cavities and the white dots are due to segregation. Fig. 4 shows exactly the same condition X-rayed on another film. Practically the entire picture is obliterated by the grain pattern of the film.

It is of course also vitally important to process the films under the most carefully controlled conditions. This is doubly true because carelessness in the darkroom will not only spoil the real images, but it will produce a great number of false defects which may lead to unnecessary rejections. The operation of an X-ray darkroom is not a trivial foolproof procedure; it requires full knowledge of the photographic processes and great care and diligence on the part of the supervisor. Two illustrations will help em-

**. . . Information on the quality of welds can be obtained only by proper choice of a number of technical factors which apply in radiography. The author emphasizes the need for reciprocal understanding between the welding engineer and the radiographer of X-ray problems so that standards of acceptability can be set up. This report has been abstracted from a paper presented by the author at a recent A.W.S. meeting in Los Angeles.**

phasize this point. Fig. 5 is a simple pressure mark caused by a thumb nail. Its appearance is very similar to the cracks in welds that occur at the points where the rod is changed. This false defect can be caused by carelessness in loading the film or carelessness in placing the film on the hangers. A rather pretty example of an electrostatic image is shown in Fig. 6. This "phony" is caused by pulling a film against the black paper. Unfortunately it is similar to a stress crack and can be misinterpreted.

## X-ray Equipment

The source of X-rays consists of the X-ray tube, the transformers supplying high voltage and the auxiliary

controls such as water cooling. The equipment requirements for X-raying thin welds are of course very much simpler than those for X-raying thick welds, but in all cases the convenience with which the X-ray equipment can be placed in position is of great importance both as to cost and as to the quality of the work. If it is known that a weld is to be X-rayed, accessibility should be considered from the day that the first plan of the assembly is made. A good example of this is in a certain war project on which Triplett & Barton, Inc., is X-raying every inch of 125,000 ft. of welding. This job has been so planned that the welds in the base of certain large tanks will be X-rayed while the struc-

FIG. 3—X-ray reproduction of microshrinkage of cast magnesium made on very fine grain plate showing segregation (50X).

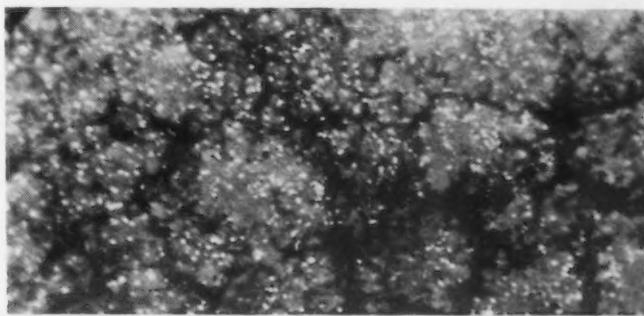
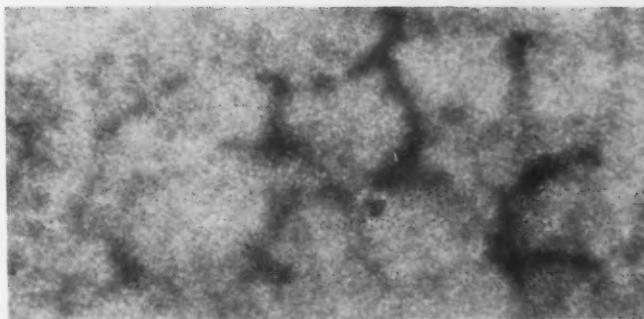


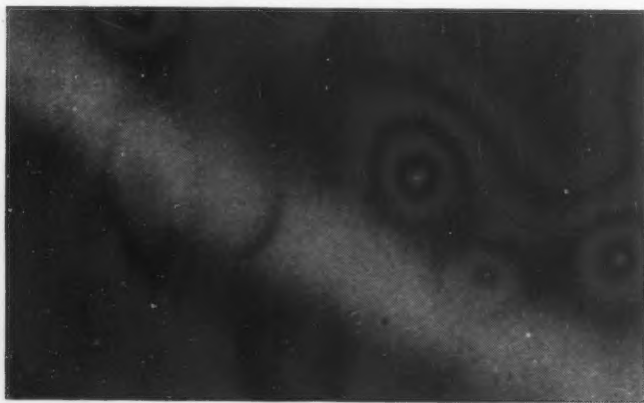
FIG. 4—Reproduction identical with X-ray shown in Fig. 3, but made on ordinary X-ray film. Grain pattern of the film obliterates the picture (50X).



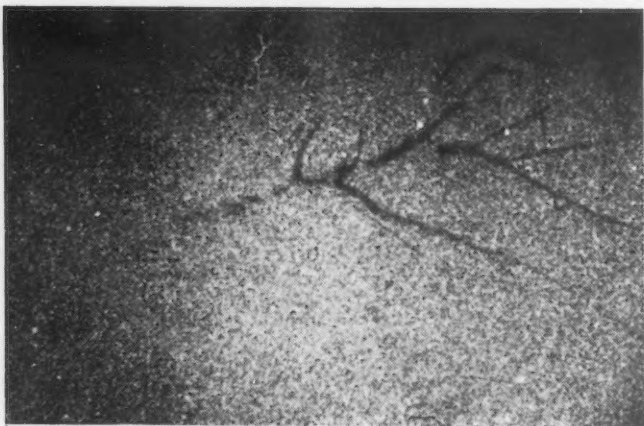
ture is supported on temporary props and then after the X-raying, the permanent bases will be built in.

Inasmuch as the thickness of welds has increased rapidly since X-raying was first specified, higher and higher X-ray tube voltage has been necessary and equipment manufacturers have provided a series of increases in available tube voltage. Any attempt to gain penetration into thick welds with relatively low voltage equipment is very unsatisfactory. The exposure time may be too long for economy, and the use of fast coarse films and screens will give unsatisfactory resolving power. There is another important reason why low voltage is unsatisfactory for thick welds. This factor is known as secondary radiation, or X-ray scatter. When X-rays are passed through material such as steel, the energy that is absorbed by the steel does not disappear, but it is re-emitted in all directions, either as a somewhat different sort of X-rays or in the form of electrons. This process is something like the action of light on a fluorescent material. For example, if a parallel beam of blue light is incident to zinc sulphide, the blue light is absorbed, but it re-appears as yellow light and this is emitted in all directions.

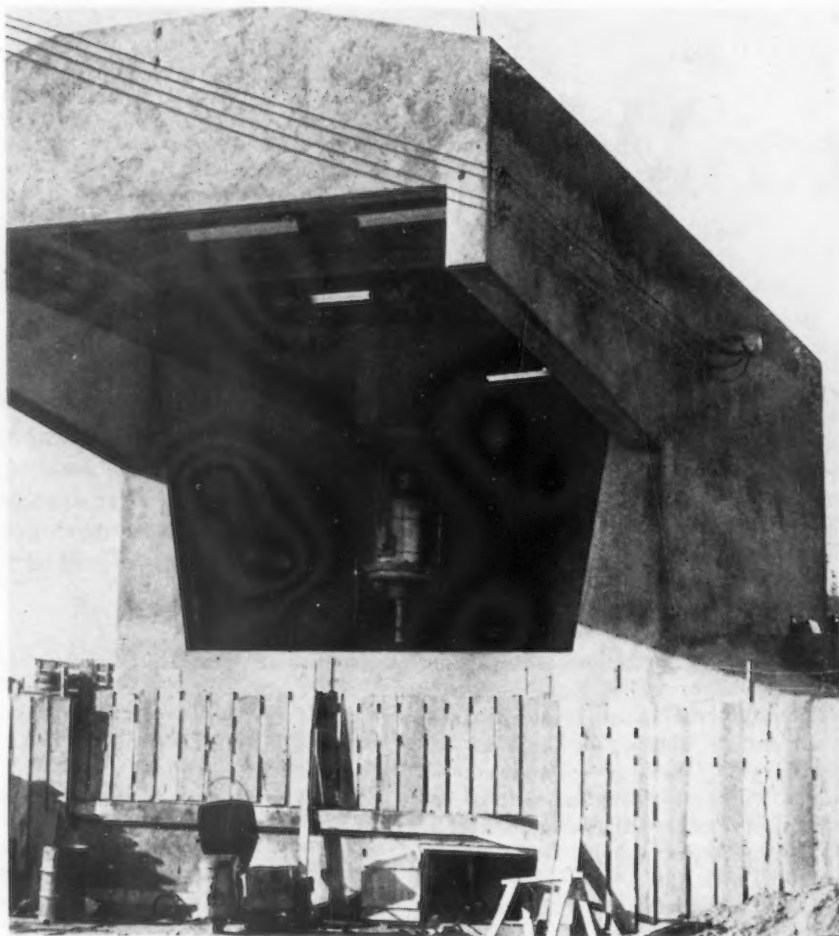
If a piece of film is placed under a steel plate 2 in. thick and an exposure is made with 200 kv. X-rays, 90 per



**FIG. 5**—A pressure mark caused by thumb nail when handling film. This false image resembles a crack in the welding head.



**FIG. 6**—A false image of an electrostatic discharge which resembles a shrinkage crack.



**FIG. 7**—Special building designed for General Electric million volt X-ray equipment. The overhanging crane arrangement permits radiographs to be made of large objects without removing them from a truck.

cent of the film blackening can be due to scattered X-rays and 10 per cent due to the primary beam. The scattered radiation is quite incapable of forming images. In this respect it is quite similar to other forms of film fogging. Only the primary beam forms the image. This means that in the example given, the phenomenon of scatter reduces the sensitivity by a factor of 10 to 1.

#### Million Volt Machine

Many years ago, a device known as the Buckey-Grid was introduced to reduce scatter and to improve sensitivity. However, this device was never entirely satisfactory for industrial use. A better way of decreasing the amount of scatter is to use a lead filter, but this increases the exposure time to a degree that is often impracticable even with 400 kv. equipment. With the 1000 kv. equipment, lead filters can be used and excellent results obtained, even on thicknesses as great as 5 in. Another beneficial way of using the great penetrating power of million volt equipment is to use a long distance from the source to the film. This increases the sharpness of the images on the film.



In our own million volt installation, we have attempted to exploit the tube's compactness by converting the standard controls into two relatively small and moveable panels. The special building designed and constructed for the purpose, Fig. 7, has several unique features; facilities have been combined for mass inspection of smaller objects such as steel castings with facilities for individual X-raying of very large objects. Anything that can be shipped on the largest truck can be X-rayed very quickly. For mass production the objects are carried on dollies on an electric railway. The movement of the dollies is synchronized with the X-ray controls and protective lead doors. For very large objects, the tube is mounted on an overhead crane so that it can be swung out into the areaway where trucks can be backed in.

Fig. 8 shows the Triplett & Barton super streamlined X-ray trailer. The fact that each trailer is a self-contained laboratory, complete with darkroom, has been a big advantage in field welding jobs, especially on oil wells.

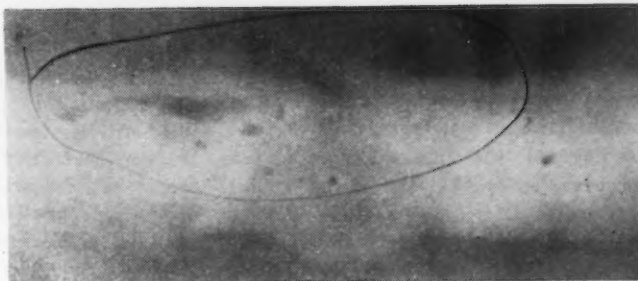
#### Interpretation of Images

Regarding the identification of the images on radiographs, an X-ray picture is simply a two dimensional distribution of film blackening. The image of any defect has shape and size, contrast and location. If there is more than one image, there is in addition the distribution of the images relative to each other. The defect that is most easily identified is porosity, Fig. 9. This appears as a group of circular dark images of about 1/32 in. in diameter. If the circles are very

FIG. 9—Porosity in an arc weld shows up in the X-ray film as dark images about 1/32 in. in diameter (1/2 size).



FIG. 10—Slag inclusions are recognized in the X-ray image by their irregular shape (1/2 size).



small, they are referred to as pinholes; if large they may be called gas cavities. Since no other welding condition gives rise to images of this shape, size and distribution, there is no difficulty in identifying porosity, nor is there any danger of the welding engineer misunderstanding a reading of porosity on a report.

Slag inclusions, Fig. 10, can be recognized because the average size of the images is larger, the shape is more irregular and the distribution is strung out in a line parallel to the side wall. Cracks appear as narrow dark lines with or without branches. Distinction between stress cracks and

shrinkage cracks is based on the shape of the line image.

Lack of fusion can be recognized because its image corresponds to the edge of one of the original plates. This means that the image is a straight line parallel to the weld. However, the width of this line image varies from a very narrow line to as much as an 1/8 in. in width. Lack of fusion may be seen as an almost continuous line or it may be broken up by undercut. Undercut, Fig. 11, is recognized partly by its location at the edge of one plate and partly by elliptical extensions of the image into the plate region. Inclusions other than slag occur occasionally and they are usually easy to diagnose. For example, if a piece of weld rod is placed in the bead and is not fully fused, its outline will be revealed by a black boundary. The surface blemishes of spatter or craters can be easily recognized.

The six types of defects listed are all well known to welding engineers, the terms used to describe them are without ambiguity. Also, the cause and cure of each is fairly well known and agreed upon.

#### Standards of Acceptability

The radiographer's part of the welding-radiography partnership is to produce the best possible pictures in the shortest time and at the least cost, and do everything to make radiographs give a true picture of the type and extent of these defects. However, the standards of acceptability should not be left to the radiographer alone. As far as possible these standards should be agreed upon by the customer



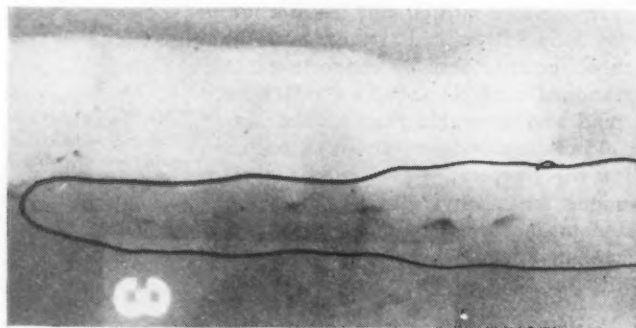
Fig. 8—Streamlined X-ray trailer with self-contained darkroom, used for field work.

and the welder before the contract is started.

In the infancy of radiography, enthusiasm sometimes resulted in the preposterous attitude that anything seen on a radiograph was cause for repair or rejection. This was utterly unjustified. But it does not compare in utter nonsense with the attitude that a radiograph should be of such poor quality that it shows only the rejectable and not the acceptable defects. The welding industry has everything to gain from the development of higher quality radiography. For example, consider the distinction between a longitudinal crack and a slight lack of penetration. On a poor radiograph the crack may not even be revealed and the product may fail in service. If it does, welding receives very adverse criticism and the next time some other method of fabrication may be used. On a moderate quality radiograph, the appearance of the slight lack of penetration may be identical with that of the crack and so unjust rejection may be made. On a good radiograph correct diagnosis can be made and both danger and waste can be eliminated.

The organization necessary for establishing acceptability standards has progressed quite rapidly in the last few years. In particular the tremendous development of welding as a

FIG. 11—Undercutting in an arc weld (1/2 size).



method of manufacturing ordnance materiel has helped. For instance, ordnance specifications illustrate various degrees of porosity and welding jobs are assigned to one of three classes, according to service requirements. Tables are used to show what degree of porosity is satisfactory in each class. For example, one illustration will show a certain degree of porosity that (a) is not acceptable in welds requiring Class I standards, (b) is borderline in welds requiring Class II standards, and (c) is acceptable in welds requiring Class III standards. In addition to the illustrations, simple arithmetical criteria for the permissible size and number of defects are given. The latter way of defining acceptability by the number of say, pinholes per inch of welding, is an extension of the original boiler-code criteria for slag. One new feature is that a degree of porosity that is re-

jectable in a thin weld may be acceptable in a thick weld.

A few words should be added about spot welds and the concentrated research program on the use of X-ray to predict their strength. An engineer will be reluctant to use spot welding on the wing sections of an airplane, for example, while he has no check on the quality of the individual welds. The sampling method in which every tenth weld is made on a test strip, provides some assurance, but only of the average weld strength. There is now a very good promise that X-ray will be able to extend the use of spot welding by giving the extra assurance of individual strength. However, again in the case of spot welds there is a vast difference between good radiographs made with suitable equipment and suitable film and poor radiographs made with equipment not specially designed for this purpose.

## Pneumatic Swagers For Tubing Perfected



**B**ATTERY of "home made" pneumatic swaging units being used to size welded stainless steel exhaust manifold port extensions.

**C**ONSTANT experiment at the metal stamping plant of the American Central Mfg. Corp., Connersville, Ind., has developed a series of powerful pneumatic swaging machines for use in sizing aircraft engine collector ring sections. With a 5000 lb. direct pull on the cylinder, combined with 4 in. of travel, a port extension tube of 16-gage 0.063 in. stainless steel can be reduced in diameter by as much as 0.030 in. at one impact.

The new swagers, which were designed and built by American Central engineers, utilize a knee-action tripping mechanism with two cam releases operating in unison from a hand release. A foot-operated valve opens the discharge on the bottom half of the cylinder and admits line pressure on the top half. Cams hold the die blocks in position until tripped by a separate hand lever, installed for operating safety. The stroke is varied by adjusting the time between application of air pressure and tripping.



# Radius Broaching of Turbine Buckets

**P**RODUCTION broaching on a radius is accomplished successfully with a new machine and a new type of broach developed by Ryan Tool & Engineering Co., Detroit. The unit, Fig. 1, was designed and built for the Elliott Co., Jeanette, Pa., in cooperation with their engineers for use in manufacture of stainless steel turbine buckets required in a number of large ship-propulsion turbines. These turbine buckets are press-fitted to the wheel of the turbine rotor by means of a combination dovetail and tongue and groove mounting which has become known as the "pine tree" design. The anchorage groove of bucket sections must be machined with high precision so that there will be full contact of the interlocking groove and tongue to assure rigidity in assembly. The problem of simultaneously broaching the five fitting surfaces of this shape presented unusual difficulties overcome in novel manner by the new device.

In the particular operation for which the equipment was designed, broaching replaces a number of difficult milling operations and has made it possible for the Elliott Co. to obtain identical machined surfaces, reducing scrap to negligible levels, and tremendously increasing output. Al-

though the machine has been used exclusively in this specific work up to now, it can be tooled for production broaching of virtually any other part requiring finishing in circular contour or spherical section.

The machine's mechanical principles are simple. Rather than moving in a straight groove, the broach is fastened to the end of a swinging arm. A connecting rod, actuated by a rocking hydraulic power cylinder, drives the broach downward through an arc whose radius is dictated by the length of the adjustable arm.

The satisfactory functioning of this apparently simple idea, however, provided many headaches for the Ryan Co. and particularly for Anthony Messina, who was called upon to develop some entirely new ideas for finishing surfaces to the extremely close tolerances required. In cooperation with two Elliott officials, J. F. Mattern, director of machine tools and facilities, and H. W. Newbergh, director of inspection. Mr. Messina worked out his original idea to include some rather extensive possibilities.

For one thing, a solid broach was out of the question, for rake and clearance angles on each tooth of the piece had to differ to take care of change in relative position to the

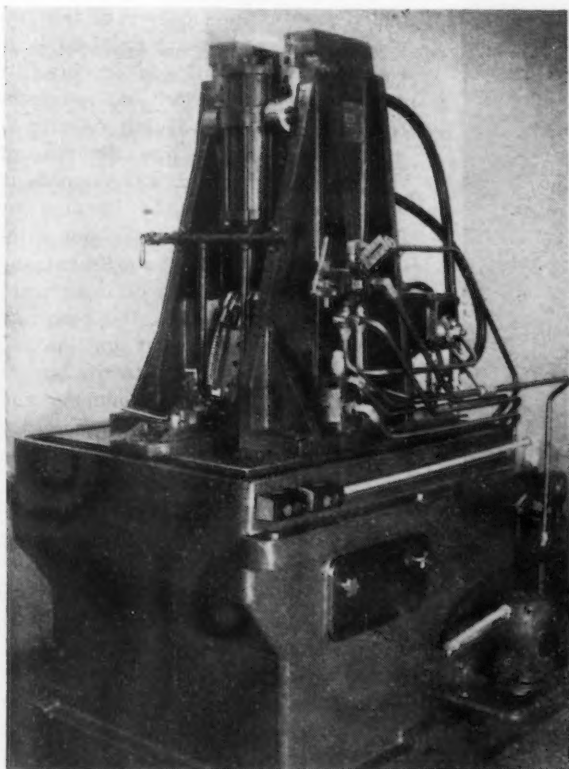
workpiece during cutting. Therefore, Mr. Messina invented a single tooth built-up broach which allows maintenance of the exact form on each tooth to control each increment of metal removed from the workpiece. The five broaching surfaces of each tooth are held to 0.0002 in. tolerance. A set of 17 of these cutters is assembled in a magazine, Fig. 2, for attachment to the swinging arm.

The use of separate sections has simplified the regrinding of teeth after they have worn to the point that bucket shanks fail to pass inspection gaging. The separate sections also permit replacement of any blade which might be broken without disturbing the others. They also eliminate the need of discarding the entire broach when any one tooth is mistakenly ground undersize.

The first ten of the 17 teeth shave metal in diminishing thicknesses from 0.0010 to 0.0006 in. Subsequent broaching is primarily for sizing.

These teeth are made of high speed steel, each with individual rake and clearance angles. Moving through stainless steel turbine bucket stock, their travel is very positive and chips removed are very uniform. Travel of the broach head can be varied up to a speed of 30 ft. per min. A heavy

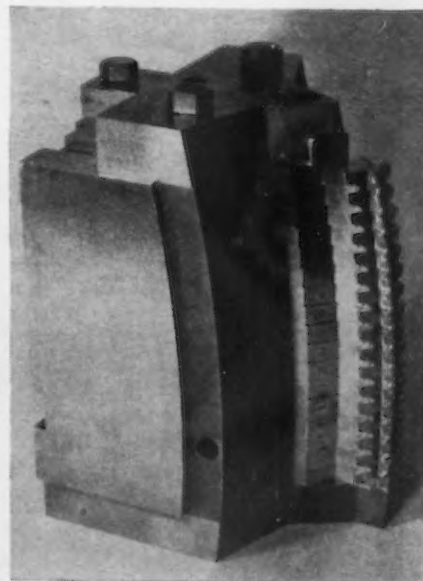
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LEFT  
**FIG. 1**—On this Ryan broaching machine, the set of broaching tools is mounted on an arm which is pivoted to swing in a vertical plane, thus producing a cut on a radius corresponding to the length of the arm. The hydraulic power cylinder may be seen pivoted above the broach head, with the piston rod serving as the connecting link.

BELOW

**FIG. 2**—This closeup shows the broach magazine inverted from the position in which it is mounted in the machine. The 17 separate broaching teeth are set to take a progressively lighter cut. This broach is designed to machine the crown, dovetail and the two back faces on each side of the "pine tree" design of turbine bucket anchorage in the rotor.





# Annealing Aircraft Parts in Pan American Shops

By F. K. WHITESIDE

Engineer of Industrial Gas Utilization,  
Brooklyn Union Gas Co., Brooklyn

**... At Pan American new repair shop, radiant heat is used to anneal and harden aluminum alloy parts. Furnace design and operating methods are herein discussed.**

**R**EALIZING the advantage of being able to anneal and harden the aluminum alloy parts used in the repair of its Clippers with minimum delay, Pan American World Airways incorporated in the plans for its new shops at LaGuardia Field, New York, a salt bath heat treating furnace capable of handling sheets up to 14 ft. long and 4 ft. wide. After giving due consideration to the merits

and costs of various furnace designs and heating media, Pan American decided upon a gas-fired unit equipped with radiant burners.

The pot containing the salt bath is 14 ft. long, 2.5 ft. wide and 5 ft. deep on the inside. It is constructed of 1½ in. firebox steel with double welded seams. Around the top of the pot is welded a 7 in. structural steel channel with flanges turned downward. The outer flange of this channel fits into a sand seal at the top of the furnace setting. The pot weighs approximately 5500 lb. and holds, when full, 10 tons of salts. A mixture of sodium and potassium nitrates, with a melting point of 425 deg. F., is used.

The operating temperature ranges between 650 deg. F. for annealing and

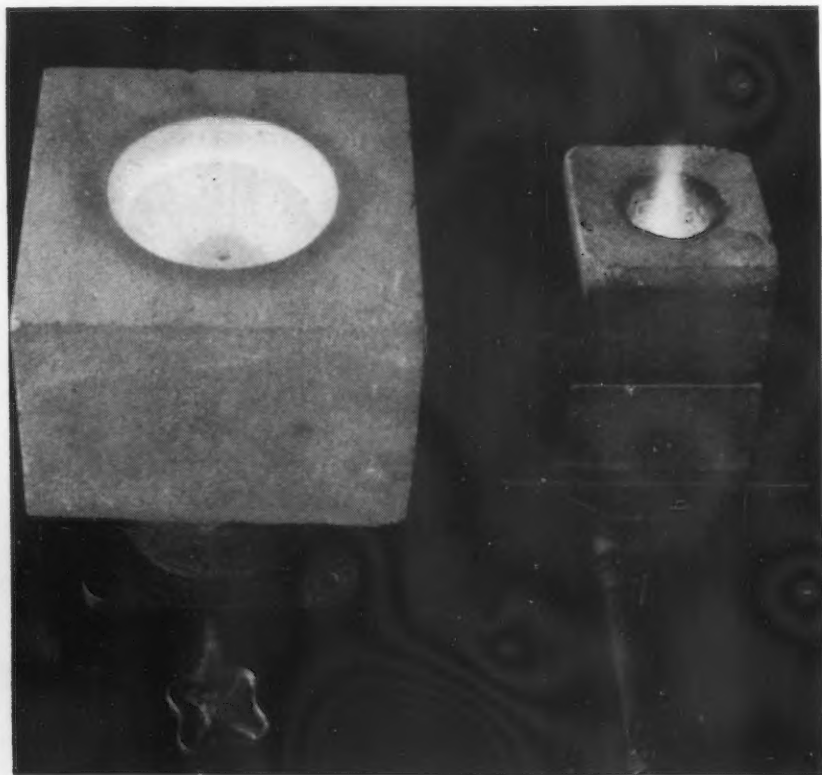
920 deg. F. for solution heat treating.

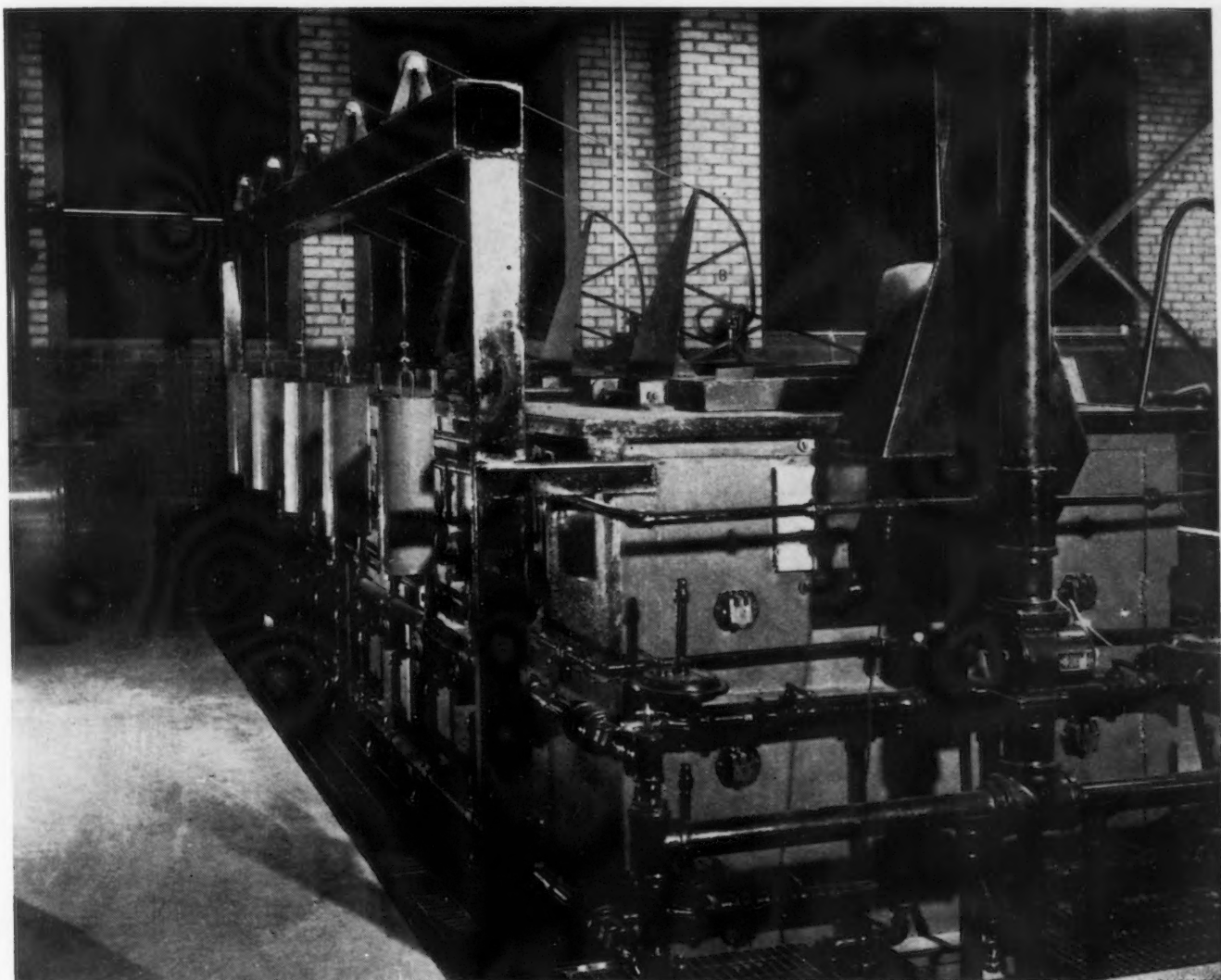
As the furnace is used intermittently as the need arises, the time required for heating up is of considerable importance. This requirement was one of the principal factors which brought about the selection of radiant burners. Another determining factor was the necessity of obtaining absolute uniformity of heating and therefore, heating by a multiplicity of radiant burners was chosen. Since 70 per cent of the area of the pot surface is in the two sides, and since the width is quite small as compared with the length and height, only the sides are used for direct heat absorption from the radiant burners.

The burners which were selected for this application are the all-ceramic Duradiant burners manufactured by Selsco Co., Philadelphia. A view of one of these burners is shown in Fig. 1. Gas and air in proper proportions for perfect combustion issue from the burner tip in a large number of small streams tangent to the burner cup. The design of the cup is such that the products of combustion swirl back toward the burner tip in an involute curve. They, therefore, do not issue from the burner at a high velocity or in a direct straight line. Because of this characteristic, it was possible to place the faces of the burners no farther than 8 in. from the pot without danger of flame impingement and hot spots. The surface of the burner cup is corrugated, and the resulting turbulence causes instant ignition and holding on of the flame to the burner tip. The combustion products soon raise the burner cup to incandescence and provide the radiant heat from which the burner obtains its name.

With this particular relation between burners and object being heated, there exists an ideal condition for heat transfer. The pot wall for all practical purposes is a black body and absorbs most of the radiant heat directed toward it. The heating source is at a relatively high temperature and is located very close to the object being heated. It was found that when

**FIG. 1**—Typical ceramic-cup radiant gas burner (left) shown during throttling operation, compared with a typical conventional single-port burner operating at the same input and air-gas ratio. The uniformity of incandescence in the cup and absence of flame beyond the burner face can be seen.





**FIG. 2**—To provide a working opening varying between 3 ft. and 14 ft. in length, the furnace is provided with five individually hinged and counterweighted covers made of 3 in. channel iron and lined with cast insulating concrete.

o o o

heating the furnace up from a cold start to 920 deg. F., 70 per cent of the B.t.u.'s were effectively utilized in heating the pot and the salts. It was interesting to discover how little heat was absorbed by the furnace setting during the heating-up period. By subtracting the calculated heat in the flue gases from the remaining 30 per cent, it was found that only 4 per cent was unaccounted for. The greater part of this 4 per cent was absorbed by the furnace walls and piers. Only a small portion was lost by radiation from the furnace.

For purposes of stability, the furnace side walls are constructed of 9 in. of insulating firebrick with no additional insulation. In order to contain the flues, the end walls are of insulating firebrick 13½ in. thick. The bottom is constructed of 5 in. of insulating firebrick backed up by 1½ in. of block insulation. During operation, because of the radiance from the burners, the furnace walls appear also to be incandescent, but shortly after the burners are shut off, it is apparent that what appeared to be heat in the

walls was only a reflection from the pot. At no time during the heating up period do the pot sides become overheated. If when the salt bath is approaching a temperature of 920 deg. F., the burners are shut off, only by the closest scrutiny can any color be detected either in the furnace or pot walls.

In order to obtain uniform distribution of heat, 44 Selsas Duradiant burners are used, half of these being on each side of the furnace. The burners are placed in three horizontal rows spaced 15 in. apart vertically. There are eight burners in the top and center rows and six in the bottom row on each side. The burners are manifolded in eight groups of four and four groups of three, making 12 groups in all. Each group is supplied with its properly proportioned mix-

ture of air and gas by a Selsas low pressure proportional Mixer and individual zero regulator on the gas line. Air is supplied by a Spencer Turbo Compressor operating at 24 oz. pressure. The gas used is a mixture of coke oven and carbureted water gas having an average heating value of 540 B.t.u. per cu. ft. and a specific gravity of 0.60.

The furnace has an hourly gas demand of 4500 cu. ft. and at this rate of consumption can be heated from cold to 920 deg. F. in slightly less than 5 hr.

For purposes of automatic temperature control, the furnace is divided into two zones, each independent of the other. The air supply to each zone is controlled by a three-position motor operated valve actuated by a Wheelco Capacitrol. While heating up, the air valve is in the wide open position. As the required temperature is approached, the valve closes part way. When the control temperature is reached the valve closes to a minimum setting which is

(CONTINUED ON PAGE 132)

# New Equipment . . .

## Power Transmission

... In this week's review, new developments in sheave units, gears, clutches, motors and motor controls, and other power transmission devices are described.

**A** SHEAVE which locks to shaft in one tightening operation has been developed by *Allis-Chalmers Mfg. Co., Milwaukee*. As its tapered split bushing, which accommodates

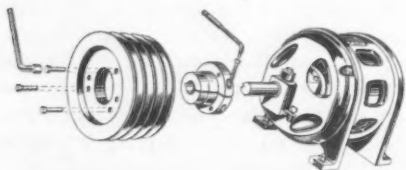
is fastened by pull-up bolts. Stock hubs, stock sheaves with interchangeable hub and rim combinations, and stock cast iron sheaves are available in standard sizes.



normal shaft tolerances, is drawn further into the sheave, the sheave, bushing and shaft are locked together simultaneously. This positive clamp fit makes sure that the "Magic-Grip" sheave is perfectly centered and secure, assuring smooth running performance free from backlash and shear. It is said the design permits the sheave to be mounted closer to motor, increasing bearing life by reducing belt overhang.

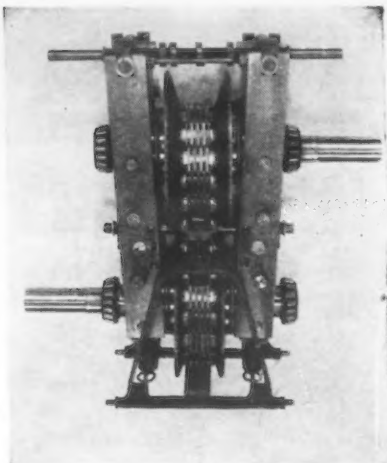
### Quick-Detachable Sheaves

**Q**UICK-DETACHABLE sheaves which can be put on and taken off with a socket wrench instead of a sledge hammer have been introduced by the *Pyott Foundry & Machine Co., 328 North Sangamon Street, Chicago*. Design incorporates a split tapered hub which is firmly clamped to the shaft and to which the sheave proper



### Gear Speed Variator Mechanism

**A**NNOUNCEMENT is made by the *Link-Belt Co., 307 North Michigan Avenue, Chicago*, that the bare P.I.V. gear speed variator mechanism is now available for integral-designing into machine tools. This infinitely variable speed transmission

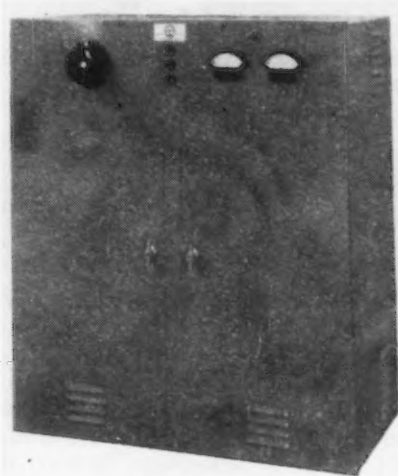


may be embodied into the machine as an integral part of it, even running it in the same oil reservoir with the change gear sets. The mechanism is of compact, all-metal construction, employing a positive drive chain making side contact with radial teeth cut on the two adjustable-diameter disks constituting each of the two wheels the chain connects.

### Electronic Motor Controls

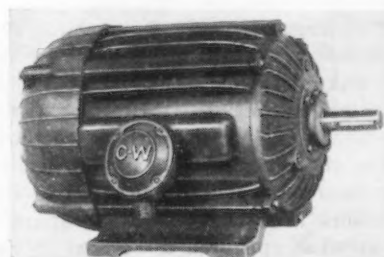
**E**LECTRONIC motor controls are made in sizes from 50 to 250 hp. by the *Electron Equipment Corp., 917 Meridian Street, South Pasadena, Cal.* The Eleco RPM control gives infinitely variable speed adjustment to a d.c. motor from a three phase a.c.

line. An electronic transformer is provided and simple gas diode tubes are used to give stepless speed control over a range of 100:1. No special motors are required. There is a choice of constant torque, constant horsepower, or a combination of these.

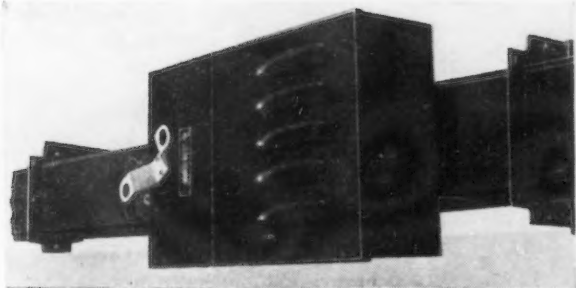


### Sealed Motor

**A** MOTOR suitable for operation in atmospheres containing injurious dusts, corrosive vapors or gases and excessive moisture, such as are often encountered in chemical plants, mines, etc., has been developed by the *Crocker-Wheeler Div., Joshua Hendy Iron Works, Ampere, N. J.* The "Sealedpower" corrosion resistant motor is available in sizes from 1 to 15 hp. and can be furnished for operation from any polyphase power sup-







ply. There are no cooling ducts to become fouled with wet or sticky dusts. All exposed parts are acid and alkaline resistant to a high degree.

### Balancing Compound

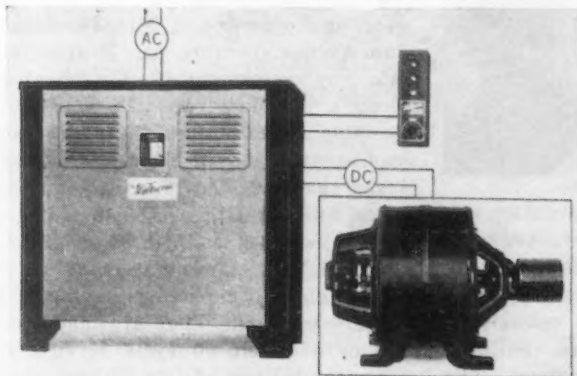
**A** MATERIAL designed for the balancing of electric motor armatures is being marketed by the *Sterling Varnish Co.*, 145 Ohio River Boulevard, Hayville, Pa. The R-943 compound comes in paste or soft putty form. It will set at room temperature in about 2 hr. to a condition such that it will not be affected by subsequent application of insulating varnishes, but it does not attain its maximum hardness and mechanical strength unless it is subjected to a temperature of 135 deg. C.

### Engine Generators

**F**OR direct assembly to the engine frame or for belted drive, the *Century Electric Co.*, 1806 Pine Street, St. Louis, has constructed a generator for gas engine drive which may be bolted directly to the engine housing and engine shaft. The engine end of the rotor is supported by the engine bearing. The generators are built for voltages ranging from 15 to 600 volts.

### Electronic Drive

**A** LINE of adjustable speed, electronic motor drives providing d.c. motor performance from a.c. power without requiring special motors is announced by *Weltronic Co.*,

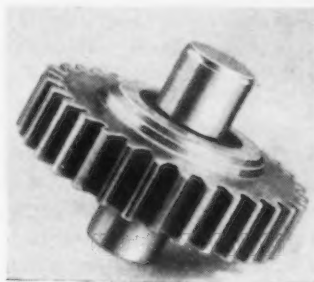


20735 Grand River, Detroit 19. The self-contained units are applicable to any machine driven by a d.c. shunt motor and eliminate the need for the special-designed motors required by conventional electronic motor controls. This feature

permits quick, easy installation of the units for the control of new machines with stock motors or machines already in operation and equipped with the usual standard d.c. shunt motor.

### Insulated Pinion Gears

**I**NSULATING pinion gears from shafting by means of applying a bushing of rubber directly between gear and shaft to stop transmission of noise, shock, vibration or impact is a development of *Bushings, Inc.*, 3442 West Eleven Mile Road, Berkley, Mich. The rubber or synthetic can be inserted without the usual inner and



outer metal sleeves and after it is in position, a mechanical bond is provided with the bore of the gear and the surface of the shafting of sufficient strength to transmit the required torque.

### Insulating Varnish

**T**HE development of R-851, a very flexible insulating varnish, is announced by the *Sterling Varnish Co.*, 145 Ohio River Blvd., Haysville, Pa.

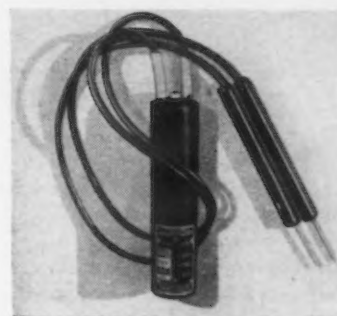
It is designed for applications that demand great lead wire flexibility and high mechanical strength. It is also recommended for coating armature and stator coils that will be stored for long periods before assembly. The dried insulation is said to be oilproof and water, acid and alkali resistant.

### Solderless Wire Connections

**A** SYSTEM of solderless knife-disconnect splicing has been developed by *Aircraft-Marine Products, Inc.*, 1591L North Fourth Street, Harrisburg, Pa., which incorporates a splicing terminal in which identical ends are put into perfect 4-point electrical connection by knife-wiping action. The connection is maintained until intentionally taken apart. The design has been adapted to T-link, Y-link, H-link and cross-link applications and to stud tabs, jumpers and small electrical assemblies such as switches and relays.

### Voltage Tester

**A** VOLTAGE tester that tests without lamps, gives positive voltage identification and distinguishes between a.c. and d.c. is offered by *Square D Co.*, 6060 Rivard



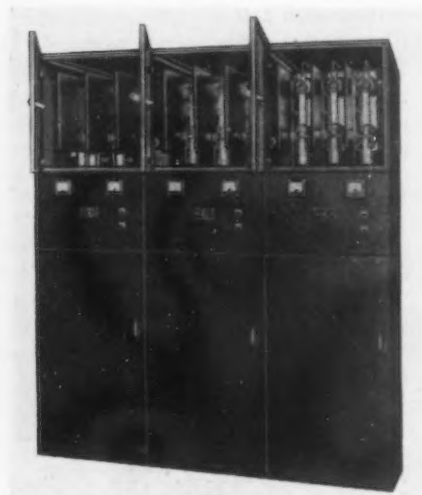
Street, Detroit 11. Voltage markings are 110, 220, 440 and 550 a.c. and 125, 250 and 600 d.c. Frequencies can be determined by the vibrations of the indicator. Sharp spear points on the ends of the leads permit piercing of wire insulation for testing without damaging it.

### Insulation Tester

**A**N electronic winding-insulation tester for production-line testing of faulty insulation and winding dissymmetries in motors, generators, coils and transformers has been announced by the *General Electric Co.*, Schenectady. Employing the principle of balance and comparison, the instrument simultaneously tests turn-to-turn, coil-to-coil and coil-to-ground insulation. It simulates qualitatively such procedures as resistance, impedance-balance, turn-balance and complete high-potential tests with one voltage application. The unit consists of a repeating-type surge-voltage generator, a cathode-ray oscilloscope and a synchronously driven switching equipment, enclosed in one steel cabinet designed for bench mounting.

### Fuse Control

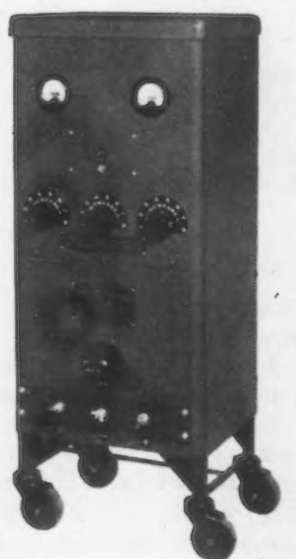
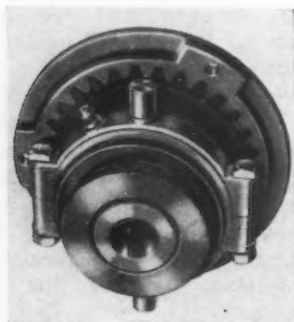
**D**ESIGNED for synchronous and induction motors, the Hi-Fuse control combines dependable starting service with short-circuit protection through the use of split-cycle operating, high-interrupting capacity power fuses, the *Electric Machinery*



*Mfg. Co.*, 1335 N.E. Tyler Street, Minneapolis 13, claims. The split-cycle speed with which the fuses clear fault current and the action of the fuse to limit current makes the motor switch amply strong to withstand the momentary fault current. The fuses also serve as power disconnects.

### Friction Clutch

**A** ROLLING-GRIP friction clutch for use where power requirements are relatively small is being marketed by *Dodge Mfg. Corp.*, Mishawaka, Ind. It is made with a 3½ in. diameter disk, rated at ½ hp. at 100 r.p.m., or with a 4½ in. diameter disk, rated at 1 hp. at 100 r.p.m. Adjustment is controlled by a threaded collar locked in place by two set-screws. The clutch may be provided with a gear tooth friction disk and drive ring or with bolted friction disk.

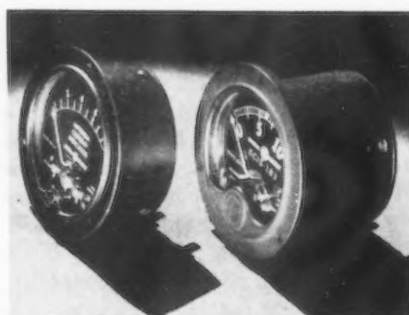


### Portable D.C. Power Supply

**D**ESIGNED for manufacturing, testing and operating all electrical and electronic equipment in aircraft and other units employing 12 or 24 volt systems, a portable d.c. power supply is manufactured by *P. R. Mallory & Co., Inc.*, Ray Storrow Bldg., Indianapolis 6. It can also be used to taper charge batteries or battery carts of similar voltages. The unit is designed to operate from 3 phase a.c. lines of 208 and 230 volts. Three models are offered, with output voltage ranges of 10 to 16, or 20 to 32 volts. Silent, motionless rectification is provided by magnesium-copper sulphide dry disk rectifiers.

### Panel Instruments

**A** NEW line of small, thin, d.c. panel instruments featuring an internal-pivot construction is announced by the *General Electric Co.* for use in aircraft, communications

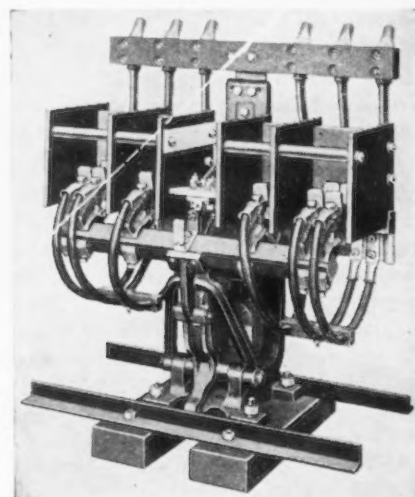


equipment and for application on various types of machinery. Available with either brass or molded Textolite dustproof and moisture-resisting cases in 2½ in. sizes, the line consists of d.c. voltmeters, ammeters, milliammeters and d.c. volt-ammeters. The

volt-ammeter has a push-button operated switch to change the reading from "amperes" to "volts."

### Motor Starters

**T**YPE ZHS starters for full voltage starting of 2300, 4150 and 4600 volt motors have been developed by the *Electric Controller & Mfg. Co.*, 2700 East 79th Street, Cleveland 4. They are available in three ratings—moderate, 25,000 and 50,000 kva. interrupting capacity. They can also be



supplied in the standard form, in the combination form (with self-contained disconnect switches) and in Type VIII enclosure for use in Class 1, Group D hazardous locations.

### Synthetic Rubber Belting

**B**ELTING made with GR-S synthetic rubber from government plants can be joined to natural rubber belting with a vulcanized splice, according to the *B. F. Goodrich Co.*, Akron. This makes it possible to use sections of the GR-S synthetic belting to repair existing belting when needed. The company's standard splicing and repair materials can be used with the new belting.

### Capacitor Plugs

**T**HE flexible capacitor plugs put on the market by the *Bulldog Electric Products Co.*, 7610 Jos. Campau Avenue, Detroit, can be inserted into any convenient plug-in opening along a bus duct run. They can be mounted at the centers of the greatest load areas or moved about as the load areas change. The plugs are an integral unit consisting of 60 amp. 3 pole fusible switches or 15 to 50 amp. circuit breakers connected ahead of 3 pole single unit capacitors having discharge resistors. They are made for 230 or 460 volt 60 cycle service in capacitor ratings of 1 to 15 kva.

# The Fires of War Burn Brightly at REVERE

These fires are kindled and controlled with knowledge and skill as well as with electric energy, for in brass, as in other alloys, the end is determined in large part by the beginning. Sound products come only from sound castings. . . . There is much more to this operation than just melting the charge and pouring it. Much metal know-how is required. Revere has it, and exercises an unusually close control over its metal, assuring itself—and you—of correct, uniform composition, so that soundness is a certainty in Revere sheet, strip, rod, bar, tube and other shapes.



**T**HERE is something fine and genuine about brass, the major alloy of copper. By varying the proportions of its constituents, and through heat treatment, brass can be made to cover a wide range of physical characteristics, from soft to hard. Where ease of machining is a factor, Free Cutting Rod offers the advantage of less wear on tools and machines, greater output, greater accuracy, and a brilliantly smooth finished surface. When cold forming is employed, tempers can be adjusted to suit the requirements. Stamping, drawing, spinning and extrusion are some of the other manufacturing processes for which brass is ideal.

Questions arise at times concerning the selection and proper treatment of the correct alloy for a given process and product. In such cases, it is a pleasure for Revere to work closely with fabricators, furnishing technical advice and practical suggestions, without obligation.

Revere brass comes not only in the usual mill products, but also in forgings, extruded and drawn shapes. . . . Write for your complimentary copy of the 54-page manual, "Revere Copper and Copper Alloys—Technical Information for Product Designers." Contains detailed information on various brasses and other alloys, with 106 graphs, new chemical and physical properties chart, illustrated welding information, much other valuable data.

## **REVERE**

**COPPER AND BRASS INCORPORATED**

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*Revere mill products—sheet, strip, rod, bar, pipe, tube—  
are stocked by leading metal distributors.*



# Assembly Line . . .

STANLEY H. BRAMS

• **Termination lesson is drawn by Ordnance, which seeks to develop a general formula from the experiences learned in selling \$125,000,000 in war plant leftovers.**



**D**ETROIT—The development of a contract termination blueprint—as opposed to a set of principles—is being attempted by the Detroit Ordnance District.

The effort to hatch and raise the guinea pig is going on at an automobile plant here. There are piled up the surplus materials and a series of case histories resulting from the fact that Hitler's tanks didn't last as long in combat as our desirably conservative planning anticipated. As a result, most of our medium tank contracts were cancelled, this plant being one of eight eliminated. About \$125,000,000 in partially or completely manufactured material, tooling and machinery, raw materials and miscellaneous scrap was left over.

Ordnance has put a special project group of personnel in the building to handle sales of the leftovers, to determine advisability of salvage of unsold items, and to pass on scrapping. Meanwhile, some 30 acres of space are tied up, under roof and outside, in storing these materials—a classic proof of industry's continued reminders to Washington that a means must be arranged soon to move terminated contract residues out of the way or face most worrisome delays in reconversion after the war ends.

The findings of Ordnance are being developed into a case study of value which can hardly be overestimated. Gen. Levin Campbell, Chief of Ordnance, has visited the display and is a most interested follower of developments. The exhibit has also been vis-

ited by those indefatigable Senators from Missouri and Michigan, Messrs. Truman and Ferguson. They were reportedly both quite impressed with the problems of termination thus demonstrated.

There is plenty on hand to impress them, or anyone else. Take the case of one fixture used during manufacture of the M-4 tank, weighing 1800 lb. and costing \$4250.

It was dismantled to determine salvage value of bushings, cam locks, bearings, etc. Reusable parts of this sort were gathered and found to have salvage value of \$9. By weight the rest of the fixture has no more value than \$11.70, on today's scrap market.

But that is only half the story. Cost of dismantling the fixture was \$33 in hourly paid time. The government thus lost \$12.30 by going into the salvage business. Better to have sold it to the scrap man to begin with.

One difficulty with that procedure, as a Detroit industrialist pointed out other day in discussing the problem, is the human equation.

"Take that job," he observed. "Suppose the stuff had been sold for a couple dollars in the first place. The dealer looks at it and figures he can sell those bushings, and tears the piece down. He gets a few dollars for the bushings and mentions it to someone, or the yardman does. By the time the word is passed down the line, he's gotten \$1000 in parts out of the piece he bought from the government for \$5. Then someone tells a reporter, and pretty soon a senatorial committee is investigating!"

Perhaps this very well-known executive had the Detroit AAF tool sale "scandal" in his mind when he spoke. Anyway, Ordnance is determined to prove that its hands are clean when it closes the books on this one disposal, probably the biggest so far in the war.

Material has been broken down into several classifications. These are evaluated as follows:

**Goods usable as is:** A total of 2021 items is classified thus far costing about \$25,000,000. These are passed on to contractors still producing tanks at actual present cost of the continuing contractors.

**Materials requiring modification:** A total of 284 items costing about \$4,000,000 is classified thus far. Attempts are being made to sell these to continuing contractors at actual cost less modification charges.

**Scrap:** Determination of scrap originally costing \$38,000,000 is by salvage panels, subsequently the Detroit Ordnance salvage board, and ultimately the Ordnance offices in Washington. Many items worth \$25,000 have already been sold as scrap at full OPA ceiling prices. Others are held up awaiting Washington approval before scrapping.

**Unusable but salable items:** In this group of 923 items classified thus far, costing about \$12,000,000, are goods which are not interchangeable or usable, but which because of high original costs or some possibility of sales should not be scrapped at this time. These items are being put into government warehouse, from which sales effort will continue.

**Raw Materials:** About 13,783 tons of steel costing about \$758,065 (\$55 per ton average) are classified thus far, all rusted from outdoor storage and requiring pickling, which can be estimated as reducing values by \$10 per ton average. Item-by-item lists have been mailed to about 7000 steel users, resulting in sales of about 5503 tons at average price of \$41.76. After bids stop coming in, the balance will be sold as a lot. Bulk selling was originally tried but only two bids were received, both from warehouses, the higher of which was \$20 per ton. Reduction of the tonnage by the item-by-item sales is expected to enhance interest in later bidding for the remaining lot.

**Perishable tools:** A total of 4347 drills, reamers, cutters, etc., is classified thus far, costing about \$5,000,000. Contractor first bought all tools desired, at full cost. The balance is being classified and offered to other war contractors at full cost to the government, distribution being from Ordnance warehouse.

**Miscellaneous production equipment:** Thus far 712 items like cranes, pumps, blowers, conveyors, etc., have been sold, 80 shipped to warehouse, and 21 retained at the contract or plant. As further lists become available, negotiations are carried on with the contractor for purchasing, warehousing or scrapping.

**Gages and measurement devices:** A total of 14,285 items, costing about \$520,000, is classified thus far. Of these, 3148 have been declared surplus and 1871 ordered scrapped. Lists go to the gage section of the termination service branch of the Detroit Ordnance District for use in the district

# What you want to Know about ANPT Pipe Thread Gages

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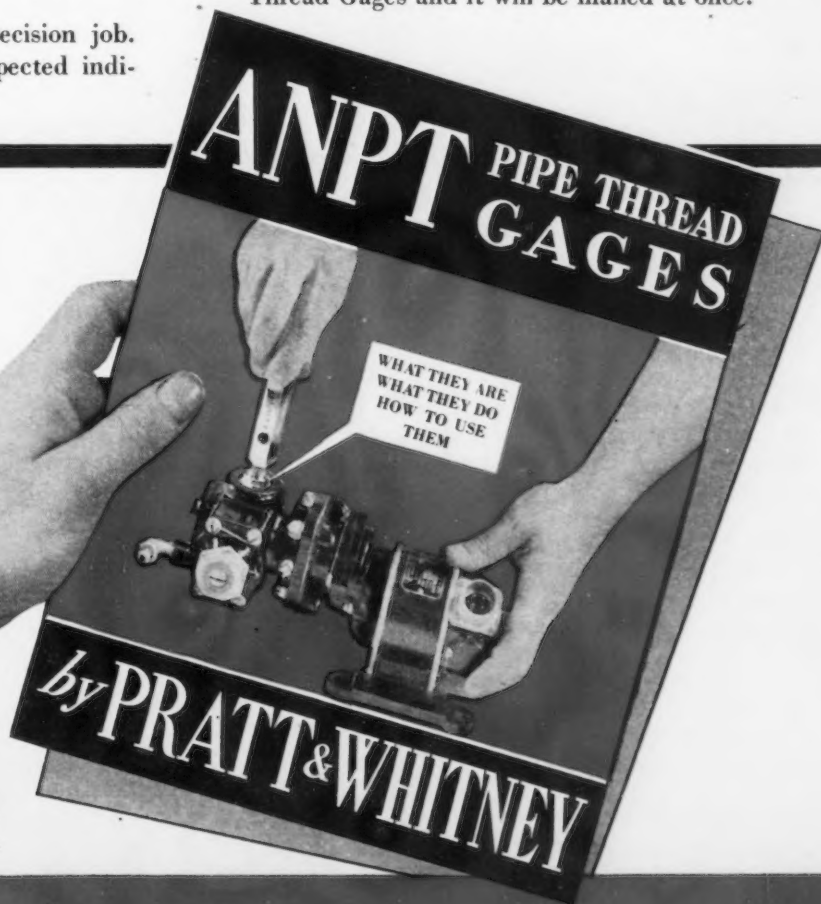
American war planes have demonstrated beyond question their ability to absorb heavy punishment and still fly. One reason is the excellence of the threads in the aircraft pipe fittings that carry vital gas and oil. Army and Navy specifications for these threads are necessarily rigid. They must hold tight, never leak, never shake loose under vibration . . . and without packing.

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The new Pratt & Whitney ANPT (Army Navy Pipe Thread) Gages provide this quick and positive inspection . . . tell almost at a glance if a thread meets the rigid government specifications or should be discarded.

It's an important subject . . . complex to understand. But we have covered it fully in a form easy to grasp in this new Pratt & Whitney booklet just off the press. Simply write on your own company letterhead for a copy of our booklet on ANPT Pipe Thread Gages and it will be mailed at once.



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laboratory or for declaration as excess. Efforts were made to sell special gages to contractors still making tanks. Unsold special gages convertible to standard use were so handled; otherwise they were scrapped.

**Machine Tools:** A total of 1518 items costing about \$11,000,000, is classified thus far. Disposal is through the production equipment section of the termination service branch of the Detroit Ordnance District in the normal district manner after the contractor and the tank branch declared the pieces as excess. Machine tools unsold or not transferred are stored in the D.O.D. warehouse.

**Moulding equipment:** A total of 2063 pieces costing about \$4,000,000 is classified thus far. Of 1145 items whose disposition has been determined, 1088 have been scrapped. No salvage from patterns, copes, dragages, etc., is expected. Jobbing foundries have been invited to bid on all flasks on the list.

**Jigs and fixtures:** A total of 2691 items costing about \$8,000,000 is

classified thus far. Up to now, 805 pieces have been warehoused in outside storage. Washington must approve disposition. It is intended to dismantle all jigs weighing less than a ton and try to sell usable parts like cam locks, bushings, gearing, etc., to tool makers. Remainders will be held for general sale. Bigger jigs and fixtures will be stripped of obviously usable parts, which will go to warehouse for sale, and the balance will be scrapped.

This is all sound procedure. It should be pointed out that the task has already taken months, and is greatly simplified by the fact that some tank production still continues. When that winds up, as at the end of the war, the recovery potential will be immensely reduced. Speed is of the essence today to save money and materials for the country, and it is of the essence after victory to give industry the facilities it needs to bring about reconversion at the pace imperative for our economic well-being.

## Goodyear Aircraft Exhibit Helps Sale of Idle and Surplus Material

### Cleveland

••• The Goodyear Aircraft Corp., Akron, Ohio, opened a month long exhibit and sale of idle and surplus inventory material here on May 15 and within two days had sold or had in the process of sale more than \$250,000 worth of material. The sale is patterned after the recent aircraft companies' sale in New York.

The material on sale reaches into every category and is said to be owned about one-third by Goodyear and two-thirds by either the Army or Navy. All material represented has been made excess by model and design changes, necessitated by changes in war strategy, Mr. Jennings of Goodyear, said.

A representative of the War Production Board on hand at the sale emphasized the importance of the sales timing. He said that movement now of all possible idle and excess material was dictated by the necessity for having as much of this problem as possible out of the way before victory. "Now is the time," he said, "to move such material when an artificial and strong market is at hand." For the same reasons, excellent prices are being received for most sales, it was said. Most sales are going at mar-

ket value, according to the Goodyear representative, with the only hedging occurring on sales of steel. This is particularly noticeable on small steel bars and tubing.

### HEAD OF STRIKING FOREMEN:

*Robert H. Koys, president of the Foremen's Association of America, appearing before the War Labor Board, said that 3,500 foremen in the Detroit area are on strike and 200 more are anxious to join them.*



The inventory which Goodyear is offering for sale totals between four and five million dollars. All sales are handled with the cooperation of the WPB Surplus Redistribution Branch and are restricted to the limitations of the WPB orders on the subject.

Questioning the Goodyear representatives regarding the volume of this material which might be going into civilian production channels, it was said that few, if any, direct sales for such use could be traced. However, a number of sales are going to distributors and jobbers who may resell to civilian industry concerns.

Typical of the thousands of items offered are: Bolts, nuts, screws, over a million washers, more than 75,000 springs and washers, airplane dope, rivets, 4700 rolls of emery cloth, 2000 ft. of steel pipe, 950 reamers, 1300 lb. of welding rod, 750 wood cutting band saws, and hack saw blades.

### Britton Presented Plaque

••• The National Machine Tool Builders' Association at its spring meeting in Cleveland on May 8 presented Mason Britton, vice-president of the McGraw-Hill Publishing Co., with a plaque as a tribute to Britton's services to the nation on behalf of the war production program. Britton, who is now chairman of the machine tool committee of the Combined Production and Resources Board of the Office of War Mobilization, became chief of the tool section of the National Defense Advisory Commission on July 2, 1940, and chief of the tools branch of the OPM on January 7, 1941, serving through the balance of that year. The plaque will not be cast in bronze until after the war.

### Trains Vickers Draftsmen

#### Detroit

••• A selected group of drafting employees of Vickers, Inc., are being trained in mechanical drawing at the University of Detroit. The class is unique in that for the first time at the U. of D. a regular college course includes only workers from one company. In the group of 17 are 14 women which were recommended by Vickers for the college training. All are high school graduates with at least two years of mathematics. The course is conducted by Professor Gerardi, director of engineering drawing.



# • HOW Easily and Economically could you MACHINE these Stainless Parts?

• **WHEN** you have a Stainless job for an automatic screw machine—or a forging that requires machining—investigate the possibilities of using a Free-Machining grade. Carpenter Free-Machining Stainless Steels offer you the opportunity to machine parts at speeds approaching that used for ordinary screw stock, and often with standard tooling set-ups.

Many of you may remember back in the early days when the machining of Stainless was almost prohibitive from a cost standpoint. Tools broke, rejects were high, speeds were slow. When Carpenter invented the Free-Machining Stainless Types 416 and 303 this picture changed almost overnight. Tool breakage practically ceased, rejects were cut to a minimum, cutting speeds were greatly increased, and the reduced costs broadened the use of Stainless.

Today, thousands of wartime products are being produced faster, to closer tolerances, at lower costs with Carpenter Free-Machining Stainless. Tomorrow, the benefits of corrosion resistance, heat resistance, high strength/weight ratio and longer life can be given to your products with this Stainless.

Check your machining operations and see if a Free-Machining Stainless grade wouldn't save you time and money, help avoid shop troubles. Your Carpenter representative has helped hundreds of other Stainless users solve tough machining problems. He can help you select the best grade for the job. Call him in now.

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LONGER TOOL LIFE  
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FASTER MACHINING SPEEDS  
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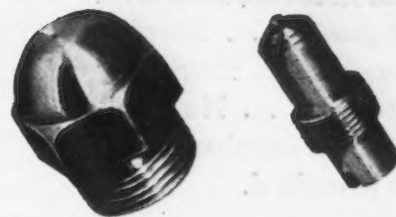
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# Carpenter STAINLESS STEELS



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## Rejects cut on these Close Tolerance Parts



A switch to uniform Carpenter Free-Machining Stainless #5 practically eliminated rejects in machining these oil burner nozzle parts. Tool life was also noticeably increased.

## Absolute Uniformity for Precision Parts



The close tolerance and high finish requirements for precision instrument parts like this were more easily obtained when the manufacturer went to Carpenter Free-Machining Stainless #5.

## Turned out on Automatics



Testimony of the easy-machining qualities of Carpenter Stainless #5 and #8 is the fact that tiny screws and many intricate parts can be accurately and economically produced on automatics.

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Strength  
Rigidity  
Heat Resistance  
Corrosion Resistance  
Longer Product Life  
Sales Appeal

## • Surplus agency headed for trouble with Congress . . . Surplus agencies to inventory material . . . Non-uniformity of surplus agencies attacked.



**W**ASHINGTON—The Administration's Surplus War Property Administration and all of its sub-agencies are definitely headed for trouble with Congress whenever that body gets around to dealing with the problem.

The principle points of attack upon the new SWPA procedure are the facts that there are so many agencies having responsibility to sell surplus property with too many unrelated offices scattered all over the country, and that SWPA shows no disposition to make uniform policy for property sales.

As matters stand, all agencies that have surplus property have been told to inventory it and to declare that which seems to them to be surplus. After property is referred to the various disposal agencies they are permitted to sell the property under their own rules.

There is no general rule governing the sale of property except that it may be sold through negotiation, auction or sealed bid after advertising. Since there is no regulation requiring publication of all sales and the prices paid to the government by individual purchasers, there is a feeling in Congress that there is a great opportunity for fraud and collusion. Of course, small sales below \$500 might be too numerous and unimportant and might cost more administratively than the safeguard of full publicity would be worth to the country. But something of this nature is needed, members of Congress said, to guarantee that favoritism and col-

lusion won't be the costly element in negotiated sales.

The Army, Navy and Maritime Commission have SWPA's permission to sell terminated inventories, and also to sell "nominal quantities" which have been defined as "single items or groups of items when the cost of all substantially similar items which are surplus at any one location does not exceed \$1000."

**A**GENCIES may also sell "scrap" which so far has not been defined and which may be anything that contracting officers and the contractors agree is scrap. Of course the contractor must warrant that the material purchased by him from the termination inventory will be consumed as scrap, but there is no limitation on the disposition made by third parties.

Finally, all property outside the continental United States is in the hands of FEA. This seems to be all right from the standpoint that a single agency may handle the disposal, but wherever there is no FEA representatives, Army, Navy or Maritime Commission officials have the duty of selling the materials. Conflicts may arise here, and FEA may make its own rules.

The main complaint of members of Congress about the decentralization is that there is no office that relates together all surpluses of whatever kind and tells a prospective purchaser where, when and under what conditions any property he wants will be sold.

For instance, in the Army alone there are more than 75 procurement offices, including service commands, where surplus property may be sold, either as termination inventory, scrap or nominal amounts. The Navy has about 11 main offices, and about 23 branch offices. RFC has 31 offices; WFA has five offices; Treasury Procurement has 11 offices. Federal Works Agency, the Maritime Commission and the Navy (combat vessels and equipment), each maintain offices in Washington.

**T**HE Congressional criticism is that there will be more than 150 offices throughout the country which will not be operating on uniform procedures, and which will undoubtedly conflict from region to region and city to city.

As to industrial inventories, RFC

is supposed to get all producer and capital goods and real property, while Treasury Procurement is supposed to sell consumer goods. Now, SWPA has divided up property along its own ideas of what property should go to each disposal agency and based on the "Standard Commodity Classification." It is assumed that there are categories of property which do not fall within the Standard Commodity Classification. In this latter case, it is going to be difficult to tell where the property may be purchased because not even lawyers can agree as to what is capital or what is consumer goods, which is real property and what is personal property. How then can the individual purchaser be expected to know?

The obvious remedy for all this confusion is the creation of a single decentralized agency to dispose of all surpluses. The new agency should apply uniform policies and secure the best procurable personnel. It may be argued that the creation of a new agency would mean more confusion than there is in the existing bureaus but this is the argument of the bureaucrats who are anxious to hold on to their jobs into the postwar period.

**I**T may also be argued that so long as the war continues the War and Navy Departments and the Maritime Commission are best organized to dispose of property during this period. But, after property is declared surplus, the agents of a separate department who are trained in their jobs, and who bring to their jobs experience in salvage, and who will operate under uniform rules will be far more responsible and do a better job for the country in disposing of surpluses than the employees and officers of the 150 heterogeneous outlets for surplus property, the majority of whom are anxiously waiting to return to civilian jobs.

SWPA Administrator Clayton, however, cannot be accused of swelling the ranks of bureaucrats. His staff is less than 25 men, and he is quoted as believing that it should be no larger. This is a good trend in government, as a general rule, but now the need is for thousands of trained government employees working together in a single agency to blot out the confusion in surplus property which already promises to be as great a fiasco this time as it did in the last World War.

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Gunmix creates great interest wherever it is demonstrated. In service, it is proving its practical value as an effective easy-to-apply maintenance refractory for hot basic furnace walls.

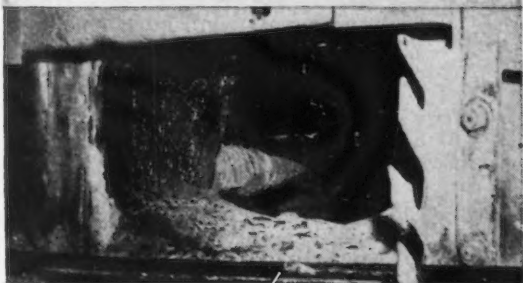
Now, tested by many months' regular use in more than a score of basic electric steel furnaces, this unique refractory is proven to have these valuable properties:

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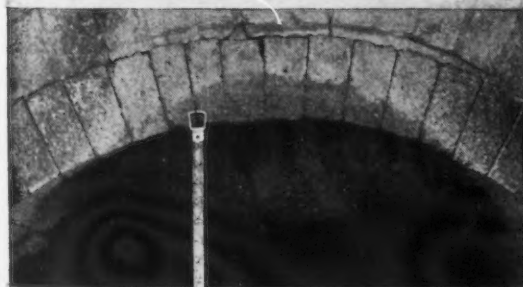
Gunmix guns are now available. Your suggestions for further possible applications of this versatile new-type refractory are welcomed.



Above—Dark areas at right of door are Gunmix repairs, applied to hot sidewall of small electric furnace.



Above—Conical knob of Gunmix—5" x 14"—stuck to electric furnace sidewall to left of work door, to demonstrate hot cohesive and adhesive nature of Gunmix. Temperature 1600°F.



Above—200 lbs. of Gunmix shot vertically on under side of brick kiln arch at 50°F., to demonstrate cold-wet adhesive properties.

**BASIC REFRACTORIES, INCORPORATED** *Cleveland 15, Ohio*



## Civilian Steel Allotment For Third Quarter Set at 240,000 Tons

### Washington

• • • WPB Increased civilian steel allotment in the third quarter by nearly 100,000 tons over previous quarter allotments in granting a 240,000 ton steel allocation to OCR. Agricultural allotments remain about the same as the second quarter, but 15,000 tons of steel was approved for garden implements.

The second quarter allotments, for farm machinery are: Carbon, steel, 326,144 tons, and alloy, 22,945 tons. The third quarter allotments are: Carbon steel, 295,341 tons and alloy steel, 18,623 tons.

While ODT received more steel in the third quarter than in the second, allotments for the railroads for car-building were down and the transportation agency only received 500,000 in the third quarter for rails, after asking for 560,000 tons. The allotment for track accessories was 265,000 tons.

Civilians got a break when the board approved an allotment of 3000 tons of steel for 60,000,000 wire coat hangers, the first to be produced since the war began. This is about 12 per cent on normal prewar annual

production. When full production was permitted, only about 25,000 tons of steel was devoted to this use on an annual basis.

## Plant Clearance on Contract Termination

### Washington

• • • War Department Procurement Regulation 15—Section VI-A (plant clearance of termination inventory) partly outlined in THE IRON AGE of May 11, page 110, is further supplemented by description of important provisions covering such points as: What the contractor should do upon receipt of termination notice; contractor's rights and liabilities, storage agreements; scrap; special rules for fixed fee subcontracts and cost plus contracts.

Upon receipt of termination notice the contractor should file forms: C-1, A.G.O. 247 (inventory schedule of raw materials, purchased parts and supplies owned by the contractor and/or by the government); C-2, A.G.O. 248, (inventory schedule of work in process owned by the contractor and/or

or the government); and C-3, A.G.O. 249, (inventory schedule of jigs, tools, dies, fixtures, etc., owned by the contractor and/or by the government).

The contractor has the right to store termination inventory immediately at his own risk, or at the expiration of 60 days at the government's expense and risk if the property has not been removed or a storage agreement entered into, provided adequate notice is given the contracting officer.

If after the original submission of inventory lists, and at the end of 60 days, property chargeable to the government and no storage agreement has been entered into, the contractor should submit to the appropriate contracting officer:

1—Demand for removal of property accompanied by

2—Inventory lists (in quintuplicate) stating that the property is on hand as of the date submitted, and

3—Certification that the property is free of any liens or other encumbrances, and that

4—The property is allocable to the terminated contract.

## Army to Hold Salvage and Termination Conferences

• • • Two conferences, one on the Army's salvage training program and the other to review progress in training officers and civilian personnel in problems of contract termination procedure, will be held by the Readjustment Division of the Army Service Forces, the War Department has announced. The salvage training conference was held May 15 and 16 in Chicago, and the termination conference will be held May 26 in Atlanta.

Both conferences will be under the direction of Lt. Col. Francis W. Parker, chief of the Training Branch of the Readjustment Division, ASF.

## Bohn Cleared in Defraud Case

### Detroit

• • • The Bohn Aluminum & Brass Corp. and three employees were found not guilty in Federal Court here last week of charges of conspiracy to defraud the government.

Bohn and the individual defendants were charged with secretly welding defective castings and sending them on to Packard Motor Car Co. for use in Rolls-Royce aircraft engines. Charges of sabotage which originally went to trial along with the fraud claims on Feb. 8 were dismissed a few weeks ago.

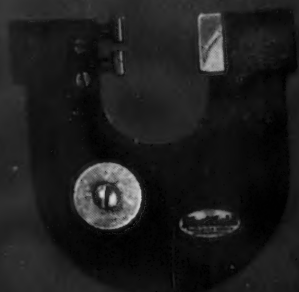
## THE BULL OF THE WOODS

BY J. R. WILLIAMS

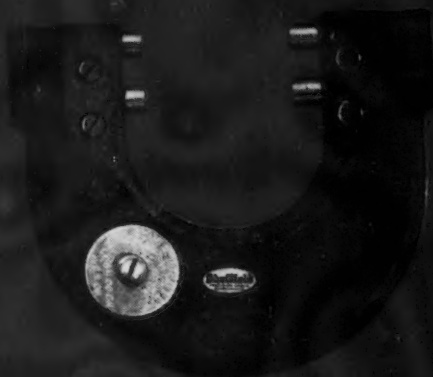


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• Ill-supported industry members on Regional WLB being outpointed by able, self-centered labor leaders and socially minded public member theorists . . . Grim foretaste of future seen.



**S**AN FRANCISCO—Do executives and leaders in industry and management realize and understand the developments in and situation with the 12 regional War Labor Boards? Beyond the war emergency, what precedents and implications are WLB decisions establishing for the future? How are industrial relations here developing? How are management and industry represented? How effective is labor representation? Who are the public representatives and how do they act?

Answers or even hints in answers to these questions are vitally important because they indicate future trends in a labor-management status. Objective and dispassionate reflection on procedure, precedent and premonition is therefore important even though it may not be particularly comforting. It seems obvious to most observers that management must become more alive and alert in its participation on the WLB tripartite panels because their dictums have inevitable effect on future general industrial relations and the functioning of public bodies in dealing with labor and management.

Of the 12 regions three affect the Far West, 9, 10 and 12 with headquarters respectively at Denver, San Francisco and Seattle and in turn covering the Rocky Mountains, Pacific Southwest and Pacific Northwest areas. Two or more full time career

men in labor relations are executive officials of each board and represent the public. One is chairman and another vice-chairman.

Additional representatives of the public are appointed from the judiciary or from law school or university economics or political science staffs, and serve on a per diem basis. From labor are two appointive AFL members and two from CIO, each with one or two alternates. To represent industry four men are appointed from industrial or employer organizations, usually attorneys or industrial relations men, each with several alternates. These boards meet every day for three or four hours. Membership on any board involves for each such part time industry appointee at least 20 hours of work per week. Except for the two full time public members, all board service carries only a modest per diem compensation, so that these men and their employers or principles are largely contributing their time and service in public interest.

**R**EPORT after report emanating from these boards includes such a phrase as: "Industry members dissented from the majority's decision ordering the increase." or "Industry members dissented on this issue." or "Industry members who participated . . . oppose the increase there granted." A sideline observer might infer that all industry members are ultra-conservative or obstructionists or bitter and narrow minded reactionaries. Is this so?

A study of the record of votes, of case histories, and an investigation of backgrounds which influenced decisions reveals that the representatives of industry, management and the employers are in general intent to hold the line or keep the lid on while representatives of organized labor are primarily anxious to obtain wage increases for union members and generally advance unionism and achieve social gains. These labor representatives are present in force at all meetings. They take their membership seriously. This is their only assignment. Their constituents are effectively organized. Whatever jurisdictional or competitive rivalries there

may be otherwise are here put aside. Labor represents a solid front. Representatives of industry, management and the employers on the other hand do not speak for an organized group. Some employers are in industry, some in service trades, some in transportation, some in general commerce and distribution. Their constituents may be formed into small trade groups entirely unrelated, but not unified either geographically or vocationally. Especially in such good times as these when all are busy, employer and industry organizations are ineffective, for individual members feel free to compete for workers and contracts and conditions of work.

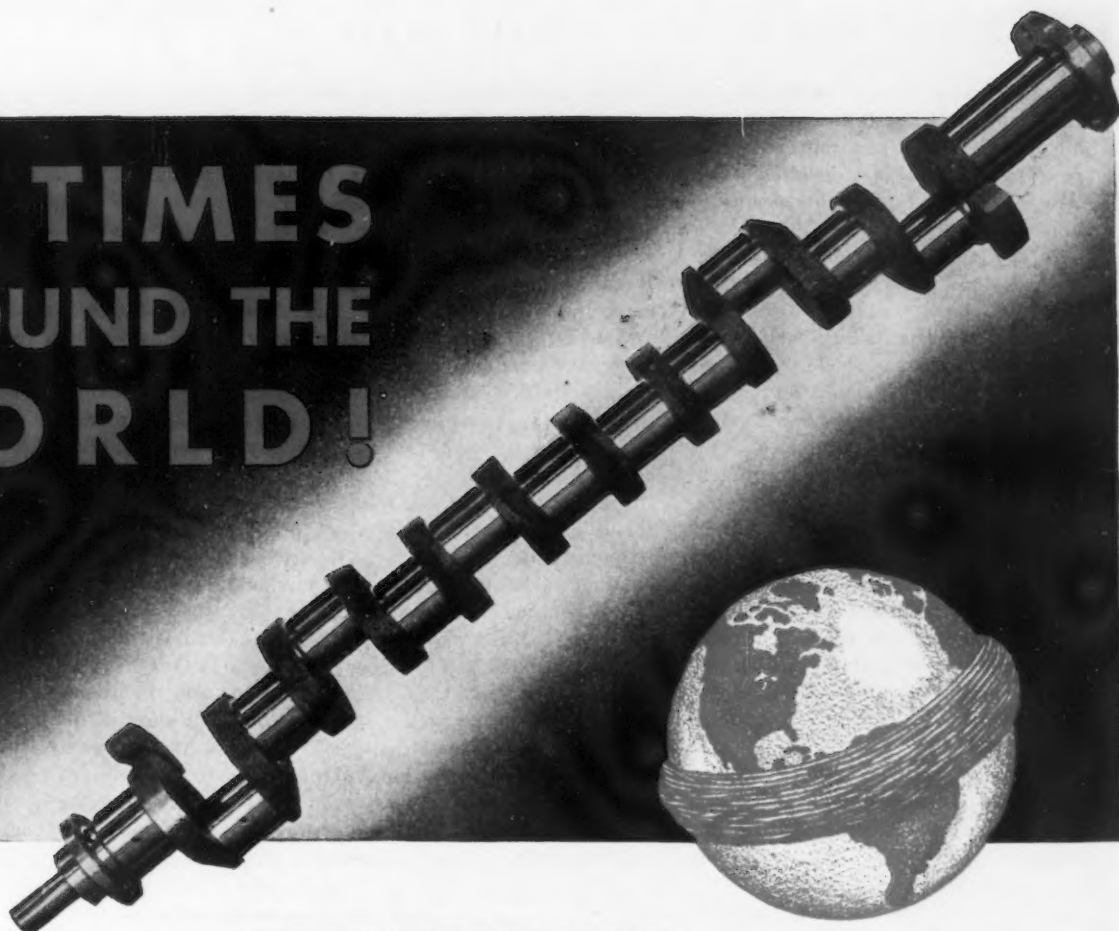
Moreover, these industry representatives on the boards are busy men, each with immense responsibility in his private profession or interest, each in a comparatively high income bracket and each in his service on the board subject to criticism, pressure and tiresome, combative experiences, so that there is every incentive to resign.

**C**ONCEDING that the public members of these boards are honest and sincere and attempt to serve the public interests, they almost universally come from an academic or legal or bureaucratic background, and are predominantly social minded with little or no rugged, practical experience. Few, if any, of them ever had to meet a payroll. They are theorists from a college faculty, or a law court, or an unsuccessful law practice, or a government agency, usually in the social security or labor relations field. If they were previously with the Department of Labor, as many key men have been, they were trained as conciliators to represent labor and defend labor's rights.

Those familiar with month in and month out procedure on the boards attest that the preparation of cases by employers and presented for industry is pathetic. Too many lawyers come introducing too many legalistic technicalities. Employers often underestimate and discredit the labor and public representatives. Organized labor, on the other hand, comes before the board with well documented, carefully prepared cases. Unions have



**40 TIMES  
AROUND THE  
WORLD!**



**AFTER 1,000,000 MILES  
TOCCO-HARDENED CRANKSHAFT SHOWS ONLY 1/1000-INCH WEAR!**

**O**NLY 1/1000-inch wear on the crankpins after piling up a service of 1,000,000 miles . . . a distance equal to 40 times around the world! That's the record of one veteran TOCCO-hardened crankshaft on one of the country's fastest streamliner trains. Hundreds of thousands of other TOCCO-hardened crankshafts are giving similar performance . . . giving 5 to 10 times normal life . . . avoiding delays for engine overhauls . . . keeping engines of the United Nations on the straight path to Victory.

TOCCO-hardened crankshafts are used by the firms listed.

Investigate TOCCO for improved and faster hardening, annealing, brazing and heating.

**THE OHIO CRANKSHAFT COMPANY**  
Cleveland, Ohio

**THESE ENGINE BUILDERS  
USE TOCCO-HARDENED  
CRANKSHAFTS**

Caterpillar Tractor Co.  
Chrysler Corporation  
Cummins Engine Company  
General Motors Corp.  
Hercules Motor Corp.  
International Harvester Co.  
International Plainfield  
Motor Company  
White Motor Company  
and many others.



**TOCCO**

**HARDENING..BRAZING  
ANNEALING..HEATING**



research departments with expert consultants and Phi Beta Kappa economists whose data and representation are keen and effective, designed especially to appeal to the liberal-minded public representatives.

Moreover, each regional board as organized has a large staff of economists, analysts, investigators and technical consultants as well as a large stenographic and clerical force. These are all civil service employees, largely recruited from the temporarily eclipsed social agencies, such as the National Youth Administration, the Farm Security Administration, the Bureau of Labor Statistics or other public agencies generally sympathetic to labor's objectives and suspicious of business and industry. Not infrequently, therefore, the technical report and analysis which accompanies each case presented to the board is colored and interpreted with this bias.

**W**HAT then are the results and effects of the set-up as it has developed? How do things work out in practice?

In his "hold the line" message of April 8, 1943, the President said:

"The only way to hold the line is to stop trying to find justifications for not holding it here or not holding it there."

Records of regional boards indicate that it is the industry members rather than the public members who have sought to follow that policy. With acute shortages of manpower, particularly on the Pacific Coast, and high taxes, individual employers are seeking governmental permission to pay higher wages. The records indicate that most increases, perhaps 90 per cent, are sought by employers either individually or jointly with unions. This results in pressures on the management representatives to vote for such proposals and one would expect to find industry and labor members voting as a majority in favor of such proposals. But the records show frequent and vigorous dissents from the industry side of the table against wage adjustments ordered or approved by public and labor and very few complaints from the public. This shows clearly that the industry and management members have sought to "hold the line" against inflationary increases far more than have the public members.

Steadily and repeatedly contracts are approved, directives issued and decisions handed down which embody frills, features and concessions which

will be much harder to lose than they were to gain. Perhaps in some hazardous relationship between employer and worker a provision for 15 days' annual sick leave was first embodied. Quickly and cleverly organized labor works to have such provision embodied in all other contracts in the same industry. From there, like a feverish infection, it spreads to other contracts until it is established as a "social gain," and once entrenched it becomes a precedent. When longshoremen have a basic six-hour day between eight in the morning and three in the afternoon, with overtime for all other hours worked at other times of the day, such a favorable basis of reckoning is naturally envied for other contracts and becomes a precedent. Many awards grant retroactive pay back, 6, 12, 18 and even 20 months. Not only may the basic pay be increased retroactively for this period but the basic hours of work may be reduced, so that retroactive overtime is compounded. Even when rates of pay return to lower levels postwar, when supply has again be-

come adjusted to demand, nevertheless those familiar with industrial relations believe that many of these frills and furbelows, these concessions and so-called social gains now being contracted and conceded will remain rather permanently.

A trick of a clever union leader which catches some anxious and busy employer off guard becomes an opening wedge. Having landed one sucker it's far easier to hook the next. Before long a principle and precedent have been established. Just as in panzer tactics, a weak spot in the line is breached and the attacking force spreads out to over-run great areas behind the lines, so spread concessions, grants, "social gains" and costly, extravagant conditions of work.

Only by more complete organization, by true collective bargaining on the part of management and industry and through the availability of able, technically trained, earnest, alert, realistic industrial relations men for industry can the scale be better balanced.

## Kaiser Outlines National Postwar Plan

### Cleveland

••• The appearance of Henry J. Kaiser, employer of 300,000 people, appearing as a guest speaker before the CIO-USWA convention here on Friday, May 12, nearly startled convention delegates out of their seats. Kaiser, however, did a good job of getting the attention of the delegates by presenting a four point plan for postwar conduct. Kaiser suggested: (1) that advanced orders now for 500,000 automobiles for delivery after the war be permitted; (2) an expanded aviation program which would provide full employment for the 4,500,000 now employed in the aircraft industry; (3) an adequate housing program that would fully absorb the building trades and those industries which supply the building trades; and (4) a nationwide network of high speed highways, apparently aimed at both utilizing labor to build the roads and gaining the advantage of a more completely fluid population and flow of industrial products.

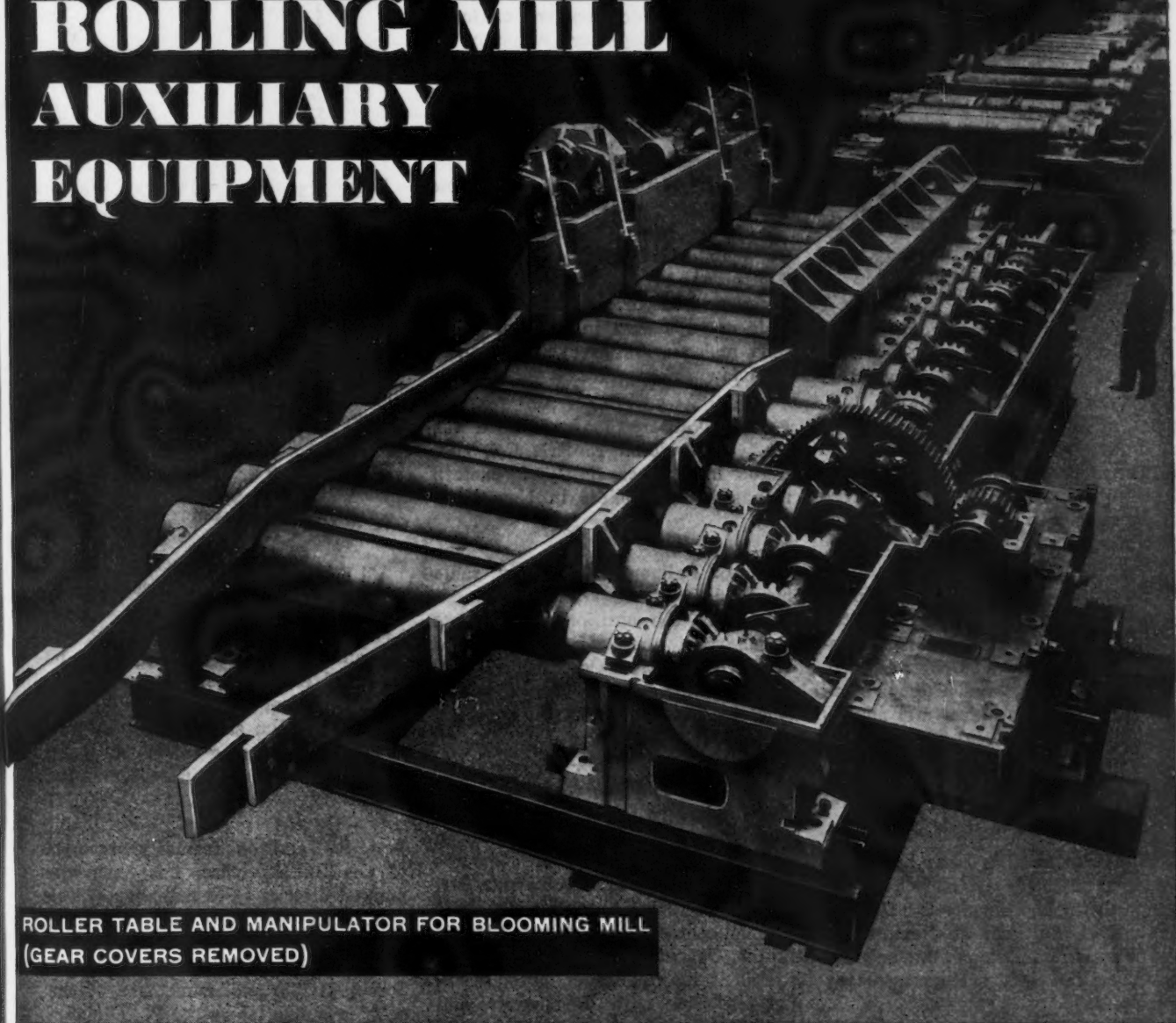
Mr. Kaiser said, "I now venture to propose that industry be encouraged by the government to take on a pre-selling program; that orders be accepted now for postwar delivery; that on such orders made in good

faith industry have the fortitude to fix a price; and that labor have the courage to enter into postwar contracts now which will be binding on all orders taken in advance." He also proposed a network of from 3000 to 5000 air terminals for personal plane operation. Kaiser envisioned a million personally operated planes over the U. S., this to be accomplished within the next 10 years. Saying that such an estimate may be far too conservative, he added, "I have in my hands the details of this plan with sketches of the facilities they will support, preliminary surveys of the construction and operation, estimates of cost for each type, possible revenue, man hours of employment and suggestions for financing."

Regarding housing, Mr. Kaiser said the need for comfortable adequate housing in America is so great that it promises an immense labor market for years to come.

His highway program, he said, would "break the traffic bottleneck in every city of America." He pointed out that the highway plans already announced by the government offered the true key to the expansion of the automotive industry.

**WE BUILD  
ROLLING MILLS  
AND  
ROLLING MILL  
AUXILIARY  
EQUIPMENT**



ROLLER TABLE AND MANIPULATOR FOR BLOOMING MILL  
(GEAR COVERS REMOVED)

**HYDROPRESS • INC.**

ENGINEERS

CONTRACTORS

**HYDRAULIC PRESSES • ROLLING MILLS  
STRETCHERS • PUMPS • ACCUMULATORS**

570 LEXINGTON AVENUE • NEW YORK • N. Y.



# PERSONALS



**JACK E. GOULD**, superintendent, Tubular Alloy Steel Corp.



**EARL R. SAYRE**, application engineer, P. R. Mallory & Co.

• **Robert J. Ritchey** has been appointed manager of the market development division of Carnegie-Illinois Steel Corp. Mr. Ritchey began his service with this U. S. Steel subsidiary in 1937. He successively became product development engineer, development engineer, assistant to the manager of sales promotion, and in 1942 was appointed assistant manager of the market development division.

• **Andrew Liston** has been appointed sales manager for marine products of the Baldwin Southwark division, The Baldwin Locomotive Works, Eddystone, Pa. Formerly, Mr. Liston served in various sales and engineering capacities in hydraulic turbine and marine products activities of Baldwin Southwark.

• **Julian A. Hawks** has joined the staff of Appleton Electric Co., Chicago, in the capacity of eastern manager, with offices in New York City.

• **P. L. Palmerton**, formerly radio merchandise manager, has been advanced to the position of assistant manager of the Radio Division of Western Electric Co., Inc. **D. C. Hickson**, manager of the division's office in Washington, D. C., has been made staff assistant.

• **Edgar C. Thomas**, recently honorably discharged from the U. S. Army with the rank of major, has been elected vice-president of Thomas Machine Mfg. Co., Pittsburgh. Mr. Thomas has spent his entire industrial career in the company, founded by his father, George P. Thomas. As vice-president he will direct sales, working through both Pittsburgh and Philadelphia offices.

• **Dr. George H. Young** has been appointed executive assistant at Mellon Institute of Industrial Research. Dr. Young has been associated with the Institute since 1935. His new duties will be concerned with the management of research programs of the Institute.

• **Lincoln E. Walker**, for the past six months assistant general manager, has been appointed general manager in charge of all activities of the Murchey Machine & Tool Co., Detroit.

• **Jack E. Gould** has been appointed superintendent at the Gary, Ind., plant of Tubular Alloy Steel Corp., a U. S. Steel subsidiary. Prior to this appointment Mr. Gould had been assistant to vice-president in charge of operations in the Pittsburgh office of National Tube Co.

• **Dr. H. J. Rose**, of Mellon Institute, Pittsburgh, has been elected vice-president and director of research of Bituminous Coal Research, Inc. Dr. Rose has had extensive experience in the technical and administrative phases of coal research. He was formerly connected with The Koppers Co. and the Anthracite Industries, Inc., New York.

• **E. L. Gartner** has been appointed manager of the Metal and Ore Division, Grasselli Chemicals Department, E. I. du Pont de Nemours & Co., Wilmington, Del. **V. R. Daub** and **L. C. Pejeau** will act as assistant managers.

• **Dr. Robert H. Aborn** has been appointed supervisor of physical metallurgy of the U. S. Steel Corp. Research Laboratory, Kearny, N. J. Dr. Aborn has been a member of the laboratory staff since 1930, and specialized in research on alloy steel and welding.

• **William C. Robinson**, president of the National Electric Products Corp., has been elected a member of the Board of Directors of the Westinghouse Electric & Mfg. Co., East Pittsburgh.

• **Earl R. Sayre** has been made an application engineer for the electrical, electronic and metallurgical products of P. R. Mallory & Co., Inc., Indianapolis. Mr. Sayre was formerly associated with the Arrow-Hart & Hegeman Electric Co.

• **C. P. Joslyn** has been appointed sales manager of the Synthetic Sales Division, Goodyear Tire & Rubber Co. Operating in this division and responsible to Mr. Joslyn will be **H. R. Thies**, manager of plastics and chemical sales; **A. F. Landefeld**, manager of pliofilm sales; **O. C. Pahline**, in charge of flooring sales; and **H. D. Herbert**, who is manager of airfoam sales.

• **A. S. Hamilton**, formerly manager of the Buffalo office, has been appointed district sales manager of the Cincinnati territory of Wheeling Steel Corp., Wheeling, W. Va. He succeeds Henry E. Smith, resigned. **Joseph S. Borland**, a member of the sales organization in the Philadelphia district for many years, succeeds Mr. Hamilton at Buffalo.

• **Dr. Donald H. Davenport** has been appointed director of business research for the Curtiss-Wright Corp., Airplane Division, with headquarters in Buffalo.

• **Howard L. Dawson**, formerly assistant chief engineer for Carnegie-Illinois Steel Corp., Pittsburgh, has been appointed chief industrial engineer of that company, succeeding L. J. King. Mr. Dawson has been with the company since 1912.



**C. W. TRUST**, assistant vice-president in charge of traffic, U. S. Steel Corp. of Delaware.

• **C. W. Trust** has been appointed assistant vice-president in charge of traffic, U. S. Steel Corp. of Delaware. In addition to his new assignment, Mr. Trust will continue his duties as general traffic manager of Carnegie-Illinois Steel Corp., National Tube Co., American Bridge Co., H. C. Frick Coke Co. and U. S. Coal and Coke Co. Mr. Trust has given forty years of service to U. S. Steel Corp. subsidiaries.

• **F. W. Lee** has been appointed field engineer in the Philadelphia district by Norton Co., Worcester, succeeding A. W. McCune. Mr. Lee has recently been located in the research laboratories and the engineering service department at Worcester.

• **Elmer L. Weber** has been appointed advertising and sales promotion manager of the Paint Division of the Glidden Co., Cleveland.

• **V. D. Sweeney**, associated with The National Smelting Co., Cleveland, since 1936, in production and sales work, has been appointed sales manager.

• **Anthony A. Aponick** has been appointed service engineer in the Buffalo territory for the Park Chemical Co., Detroit.

• **Herman J. Hofmann** has been named director of service and sales research for the J. E. Baker Co., York, Pa. Mr. Hofmann has served Lukens Steel Co., Coatesville, Pa., as open hearth superintendent and advisor for many years.

• **Felix G. Tanner** has been named factory manager of the Cadillac plant of The B. F. Goodrich Co., Akron, Ohio. Mr. Tanner succeeds **Robert W. Ransom**, who has resigned to enter other business.

• **Harvey McKenney** has been placed in charge of the alloy steel sales department of A. M. Byers Co., Pittsburgh. Mr. McKenney was formerly manager of alloy steel sales for Folsom Steel Corp. Prior to that he was associated with Crucible Steel Co. of America.

• **Ernest G. Brown** has been named general manager of mechanical goods, general products and Lastex yarn and rubber thread divisions of U. S. Rubber Co., New York, succeeding **Willard H. Cobb**, recently elected vice-president and member of the executive committee. Mr. Brown joined the company in 1929 in the central planning and engineering department. **Russell Hopkinson** has been appointed director of the company's newly formed commercial development department.

• **Leopold DeFiore** has been appointed plant engineer for South Chester Tube Co., Chester, Pa. He was formerly division engineer for the Brier Hill Plant of Youngstown Sheet & Tube Co., having been associated with that company for the past twenty years.

• **Robert H. Haley** has been appointed general traffic manager of American Steel & Wire Co., subsidiary of U. S. Steel Corp. Mr. Haley, who for six years has been New England district traffic manager of U. S. Steel Corp. subsidiaries, will move to the Wire Co.'s general offices, Cleveland.



**THOMAS BACKUS**, chief engineer, R. G. LeTourneau, Inc.

• **Thomas Backus**, formerly chief engineer for the Fuller Mfg. Co., Kalamazoo, Mich., has been made the chief engineer of R. G. LeTourneau, Inc., Peoria, Ill. He will have complete charge of LeTourneau designing, detailing, equipment testing and maintenance of quality.

• **Paul F. Mumma**, formerly assistant general superintendent, has been appointed general superintendent of National Tube Co., Ellwood Works, Ellwood City, Pa., succeeding **L. J. Mason**. Prior to serving at Ellwood, Mr. Mumma was superintendent of open hearth and bessemer departments of the company's National Works at McKeesport, Pa.

• **Eric Morrell** has been appointed assistant to **Noel L. Dahlander**, president of the American Chain Ladder Co., Inc., New York.

## OBITUARY...

• **Charles M. Smillie, Sr.**, who established in 1889 in Detroit, the tool company bearing his name, died May 11. He had retired a year ago.

• **Thomas I. Curtin**, president and treasurer of the Waltham (Mass.) Foundry until his retirement in January, died recently. He was 63 years old.

• **Earl W. Roberts**, Detroit sales representative who at one time was president of Roberts Brass Mfg. Co., founded by his father, died recently.

• **John A. Longacre**, recently retired, who for many years was resident vice-

president of the American Equipment Division of Pittsburgh Screw & Bolt Corp., Norristown, Pa., died April 25. He was one of the founders of the American Equipment Corp., serving as its president prior to holding the vice-presidency.

• **James W. Garrison**, sales engineer for the National Machine Products Co., Detroit; the Twentieth Century Brass Works, Minneapolis; and the Accurate Screw Co., Chicago, died recently, after a short illness. He was 41 years old.

• **John D. Bogle**, 55, well known electrical engineer at Udylyte Corp., Detroit, for many years, died suddenly May 9.

# Fatigue Cracks

BY A. H. DICK

## Test for Mr. Pedlow

• • • Maybe you noticed from the "Dear Editor" page that George Pedlow, of the Pedlow Machine Co., gave the brains department its come-uppance by writing:

"Of course, you realize that the advertising is now read more thoroughly than the articles or editorials."

As a test for Mr. Pedlow we have picked at random ten trade names advertised in last week's issue. The second column is a scrambled list of the products to which the trade names apply. Will Mr. Pedlow please see how many he can mate properly?

Ozalid	Grinding wheels
Horse Head	Coolant
Veelos	Print maker
Keleket	Cemented carbide
Blue Flash	Zinc
Microgrind	Steel
Carburs	V-belt
Teco	X-ray equipment
N-A-X	Heat treating furnace
Super-Cyclone	Rotary files

Forty to sixty per cent is passing. Anything higher gets Mr. Pedlow an S.O. ribbon to wear on his chest. S.O. is for superior observation.

As this test is run on the honor system, will Mr. Pedlow please complete his check before comparing with these answers: *Ozalid* print maker, *Horse Head* Zinc, *Veelos* V-belt, *Keleket* X-ray equipment, *Blue Flash* grinding wheels, *Microgrind* coolant, *Carburs* rotary files, *Teco* cemented carbide, *N-A-X* steel, *Super-Cyclone* heat treating furnace.

## Chance for V.S.O.

• • • If Mr. Pedlow finds this too easy he can go after the rare V.S.O. ribbon for very superior observation. To get this he has to name the owners of the trade names. We will be disappointed if he scores 100 per cent, as some of them have not been advertising with us very long. Fifty per cent will do. If he wants to compete he should lay a blotter over the answers below:

Ozalid	Ozalid Products Div., General Aniline & Film Co.
Horse Head	New Jersey Zinc Co.
Veelos	Manheim Mfg. & Belting Co.
Keleket	Kelley-Koett Mfg. Co.
Blue Flash	Bay State Abrasive Products Co.
Microgrind	Quaker Chemical Products Corp.
Carburs	Lincoln Park Industries Inc.
Teco	Tungsten Electric Corp.
N-A-X	Great Lakes Steel Corp.
Super-Cyclone	Lindberg Engineering Co.

## American Aniline

• • • If we had read the Ozalid ads more carefully we would have known that "aniline" has only one "a." In a recent page we wrote, *"In our youth we believed that practically everything worthwhile, outside of aniline dyes, zithers and Scotch whiskey, was the product of American inventive genius. . . ."* Which caused Arthur C. Cahow to wisecrack, *"Aniline dye is the product of American inventive genius."*

The trouble with dictionaries is that you have to know how to spell a word before you can find it.

## Aptronym

. . . The Inspection Section, Production Service Branch, Ordnance Dept., Pentagon Bldg., has an employee named G. R. Gauge.

—K. Misegades

## "All the News That's . . ."

• • • An annual reduction of about 72,000,000 tons in the production of aluminum was ordered by the War Production Board today . . .

—New York Times, May 2, 1944

This will make the 1944 output of aluminum somewhere in the neighborhood of minus 71,250,000 tons.

## Your Extra Ears

• • • An official of a Texas manufacturing company writes:

Some executives here *claim* they have no time to read.

To me, *The Iron Age* is more important than a weather report to a navigator.

The italicized "claim" is his, and even though we are a biased witness, we give the implied rebuke a loud "Amen," for we have observed that in boom times, or in bad, people find time to do the things they want to do, whether it be pulling crab grass out of lawns, learning the rumba, or reading their technical journals.

It would be heretical for us to lend a sympathetic ear to those who excuse themselves from the task of keeping abreast of developments in their professions by telling themselves, "The demands my work makes on me are so exhausting that I simply don't have enough energy left, etc." And it would be disloyal as well to the harder, more disciplined minds who realize that withdrawal from contact with others doing similar work results in stagnation.

In the old days, when it was not uncommon for an entire industry to be confined to a single area, a man could learn what was going on by keeping his ears open at the local club, tavern, or church. But now, with industry scattered all over the country, his contacts must be largely vicarious. His hired ears are Stan Brams in Detroit, Osgood Murdock in California, Charley Post in Chicago, Leon Moffett in Washington, and the others listed on page 39. He can be too lazy to listen to what these or other hired ears pick up, but he can't be too busy.

Before we descend from our pulpit we would like to announce that a publication preference survey made recently by an advertiser confirms what you always knew, that your family journal has the industry's favorite hired ears.

## Vernal Urge

In the spring a worker's fancy lightly turns to thoughts of strikes.

—Assembly Line, May 11

## Speedup

• • • Which reminds us to mention that last week Stan ("Assembly Line," page 66) Brams happened to arrive on plant call at noontime, and watched a horseshoe game in the factory yard. He noticed that the players threw two shoes at a time, both from the same hand.

"Why?" he asked a player. "It's a short lunch hour," said the player.

## Tonsil Torturer

• • • Bell's jet plane, the P-59, may be named the "Airrocket," according to last week's *News Front*. Please, Larry Bell, not that. The repetitive r's sound like a stutter, and are as un-aerodynamic as a stuck landing gear. "Airocket" is much better.

If our suggestion is adopted, we will accept as a reward a sample jet engine. There is a wet spot in our backyard, near the willow tree.

## Puzzles

Last week's Boy No. 1 made \$26; No. 2, \$37; No. 3, \$35. If you can figure out in four minutes how old Diophantus was when he died, you have deciphered his tombstone in part:

*God granted him to be a boy for the sixth part of his life, and adding a twelfth part to this, He clothed his cheeks with down. He lit him the light of wedlock after a seventh part, and five years after his marriage He granted him a son. After attaining the measure of half his father's life, Fate took the son. After consoling his grief for four years, Diophantus ended his life.*



# A Challenge to the Future ...in Motor Design



*Copperspun*  
**ROTOR**

Here is the new Fairbanks-Morse general purpose, continuous duty motor—designed for the future—available now! Never have more stamina, versatility and protection been built into a motor housing!

**BUY WAR BONDS**

## **NOTE THESE FEATURES**

- It is a 40°C. motor.
- It is a protected motor.
- It has an optional conduit box assembly.
- It has cross-flow ventilation.
- It has ball bearings—sealed in cartridge type closures.
- It has exclusive Fairbanks-Morse **COPPERSPUN ROTOR**.

*Write Fairbanks, Morse & Co., Fairbanks-Morse Building, Chicago 5, Illinois.*

# **FAIRBANKS-MORSE**

DIESEL ENGINES  
PUMPS  
MOTORS  
GENERATORS

WATER SYSTEMS  
SCALES  
STOKERS  
FARM EQUIPMENT  
RAILROAD EQUIPMENT



# Motors



# Dear Editor:

## GEAR ERRORS

Sir:

Your Mar. 23 article by Sidney Cornell, "Measuring Errors in Involute Spur Gears," is very much in line with the practice we have worked out and actually sounds as if we had had a hand in writing it.

CHARLES G. PFEFFER  
Wright Aeronautical Corp.,  
Paterson, N. J.

## ROUTING SLIPS

Sir:

Please send us twelve routing slips as advertised in THE IRON AGE, May 4 issue.

JOHANNA M. WIESE,  
Librarian  
Ford Airplane School,  
Willow Run Bomber Plant,  
Willow Run, Mich.

● The Iron Age is issued weekly and a year's supply of routing slips is 52, but to provide for wastage, about 100 are supplied to subscribers without charge. However, before the slips are supplied it is necessary that a list of readers be sent to the Reader Service Department, as the slips are printed with the subscribing firm's name and the names of readers.—Ed.

## BROKEN TAPS DISINTEGRATION

Sir:

We are interested in the method of removing broken taps by disintegrating electrically, described in the article on page 60 of your May 4 issue. Can you give us the address of the Bertrand Machine Co., Detroit, and also Elox Corp., Detroit?

J. M. BEK  
Keeler Brass Co.,  
Grand Rapids, Mich.

Sir:

We are interested in the new type tap extractors. Will you ask the two companies to send full information including prices?

W. H. McKAIG,  
Asst. Equipment Engr.,  
International Business Machines Corp.,  
Endicott, N. Y.

Sir:

We are interested in the new tap extractors. We wrote to Bertrand Machine Co., at Detroit for further details. The letter was returned to us for better address. Do you have a complete address?

JOHN A. WILSON,  
Works Supt.  
Watson Elevator Co.,  
45 Cedar Lane,  
Englewood, N. J.

● Bertrand is at 8240 Harper Ave., Detroit 13, and Elox at 18273 Livernois Ave., Detroit 21.—Ed.

## MACHINE TOOL ACCURACY

Sir:

Can you tell us where we can obtain standards of routine and method of checking of machine tools on the accuracy of machining?

W. L. J.  
Chicago

● The National Machine Tool Builders Association, 10525 Carnegie Ave., Cleveland, issued a pamphlet a few years ago on standards of accuracy for lathes. We know of no similar standards for other machine tools, but a number of manufacturers use the standards developed by Dr. George Schlesinger of England. The Industrial Press, 148 Lafayette St., New York, has published this information in book form, "Standards of Machine Tool Accuracy."—Ed.

## THEY MOVED

Sir:

In answering an inquiry on the Forging Handbook you gave our address at 7016 Euclid Ave. For the past three years we have been at 7301 Euclid Ave., Cleveland.

J. EDWARD DONNELLAN  
American Society for Metals,  
7301 Euclid Ave.,  
Cleveland 3

## HOT DIP GALVANIZING

Sir:

We are contemplating adding facilities for hot dip galvanizing. In attempting to secure details on this subject, we find there isn't too much practical information available. Can you recommend any source of practical data?

L. A. TRUMBLE,  
Advertising Manager  
Trane Co.,  
LaCrosse, Wis.

● An excellent book on the subject is "Galvanizing," by Heinz Bablik, a German engineer. The English translation can be obtained from the Chemical Publishing Co., 148 Lafayette St., New York, for \$8. A leading authority on galvanizing is Wallace G. Imhoff, consulting engineer, Vineland, N. J., who has also published considerable data.—Ed.

## EXPERTS PRATTLE

Sir:

Your Jan. 6 article, "1943-1944," was of great interest to me as a student at the University of California majoring in Foreign Trade.

You say, "there is justification in holding out hope for international exchange stabilization, tariff adjustment, and quota elimination," yet you caption the picture, "the experts prattle of currency groups."

Your article has much inconsistent thought. When you speak of your survey being of the "men's washroom type," you offer an excuse, but not enough of a one to give you the right to scoff at the effort of theorists and experts.

LEONARD CANTER  
University of California,  
Los Angeles, Cal.

● "Prattle" may be too severe, as we had no intention of scoffing at the efforts of theorists and experts, but we still think that the talk about "bancors" and "unitas" is pretty much in the prattle stage, even if the talkers have the most sincere motives. A basic requirement for a sound approach to the matter of imports into this country, is

recognition of the stark fact that we must import to export, a truth still denied in too many quarters.—Ed.

## BOILER CODE

Sir:

I have been trying for sometime, to get a copy of the international boiler code. Can you help me?

WALTER C. MARSHALL  
Gorin, Mo.

● We suggest you get in touch with the American Society of Mechanical Engineers, 29 W. 39th St., New York City.—Ed.

## REGALVANIZED WELD

Sir:

In a recent "News Front" you mentioned a new alloy, Galv-Weld," used for reglavanizing bare spots caused by welding. Is this on the market, or is it still in the experimental stage?

J. W. CARROLL  
P. Carroll & Sons,  
1406 Fairmount Ave.,  
Philadelphia

● The alloy is on the market and can be obtained from Galv-Weld Co., Inc., Dayton, Ohio.—Ed.

## IRON POWDER

Sir:

I would like to obtain general information with respect to powdered iron, as to the present production, producers in general, uses now and possible uses in the postwar period.

N. E. DAWSON,  
Vice-President  
Soule Steel Co.,  
6200 Wilmington Ave.,  
Los Angeles 1, Cal.

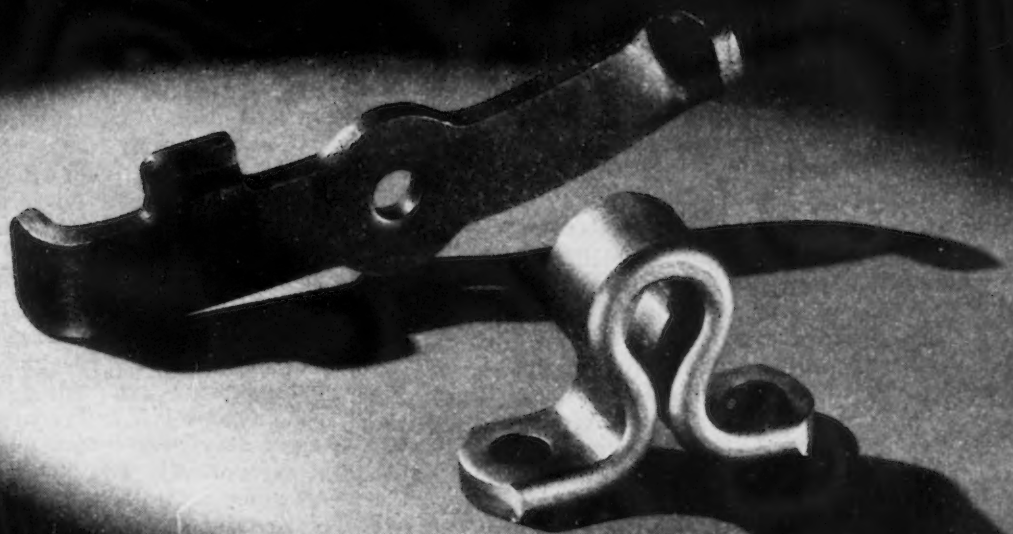
● Estimates are that production is about 700,000 lb. per year, and allocated primarily for the production of gears and, in combination with plastics, for high frequency radio coils. For information as to present and possible future uses, see the report of the powder metallurgy meeting which will be in next week's issue.—Ed.

## STRIKING PRESSURE, CHAPTER II

Sir:

Your May 11 answer to the letter headed "Striking Pressure" strikes me as entirely inadequate. Of course, it is true the number of square inches has a direct ratio to the pressure in pounds per square inch, but this leaves out an important element, namely, that the kinetic energy in the falling body ( $\frac{1}{2}mv^2$  squared) at the instant before striking must equal the same energy dissipated in process of stopping. To figure this one must know—or estimate the distance or time involved in stopping. It will depend upon the hardness of the surfaces involved, or their elasticity. But the distance the force moves in stopping determines the rate of deceleration. We also have the formula  $F$  equals  $MA$  where  $F$  is force and  $M$  mass and  $A$  acceleration. The acceleration, or deceleration, can be calculated from the velocity and the time required to stop, or distance travelled while stopping.

J. MALVERN BENJAMIN  
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Philadelphia 2



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# This Industrial Week . . .

- **Steel Buyers Watch for Clarification in War Buying**
- **Steel Centers Worried over Extended Deliveries**
- **WPB Officials Reassure Trade on Tight Steel Position**

**A**LTHOUGH there appeared to be some hesitancy in steel buying during the past week, this factor was by no means taken as an indication of a basic slowing up in order volume. More properly it is interpreted as a slight reluctance on the part of steel buyers to make further commitments until the military situation became more clarified.

Order volume on the whole was still close to actual shipments in the past week, and any decline in total backlogs was said to be slight or of no consequence. Some steel centers were still complaining that carryovers will represent one of their major troubles in months to come. This is particularly true, it was said, on plates, shapes, and semi-finished steel. The strong tempo engendered by the approaching shell program in the third quarter, the tightness in the tinplate market, and the heavy overall demand for semi-finished steel both for lend-lease and forgers, is also being accelerated by outlaw strikes, equipment breakdowns, and high turnover.

Chicago and Philadelphia steel producers are no little concerned over the relationship between actual delivery dates and commitments made when orders are received. Increasing directives are said to be coming from all quarters, principally on flat rolled material, thus further substantiating the steel trade's opinion that the third quarter will find the industry taxed to its capacity.

**J**UST as the steel industry has had a substantial burden on it for the third quarter, so have WPB Iron and Steel Division officials in attempting to bring order out of the mass of intricate scheduling problems resulting from the avalanche of invasion war needs. It is apparently realized in both the trade and in Washington that schedules and directives set up at the present time could be greatly altered or even become meaningless as a result of important developments abroad. For this reason some of the more conservative opinion is to the effect that even though the volume of orders continually increases, flat rolled picture becomes tighter, and the shell program increases by leaps and bounds, "some way" will be found to take care of the strategic war requirements as well as the more important essential civilian needs. It is noted, however, that this optimistic viewpoint is not held uniformly throughout the steel industry.

Seeking to reassure steel producers who fear the CMP is in danger of failure because of new increased military programs and "over allotments," Deputy Steel Director Joseph L. Block this week argued that there has been an excellent balance between shipments and orders placed. Mr. Block bore out previous contentions held in some trade quarters that future allotments for increased programs will be accompanied by decreases in less essential pro-

duction so that the close CMP balance between shipments and orders, which he says has been maintained, will continue. He claimed that while order carryover is remaining fairly constant, it has decreased somewhat in recent months. WPB Steel Division officials defended "over allotments" by saying that in most cases they are usually taken up by cancellations and cutbacks.

**W**HILE the steel industry and other metal industries were being faced with manpower shortages, hot weather, breakdowns, and fatigued workers, there were signs this week that they would be further hampered by an increase in outlaw strikes. The number of strikes which are coming to public attention are probably no more than a portion of the whole since many last only a day or two and are over before they are reported. Union officials have stuck to the claim that the "no-strike pledge" is not being broken even when unauthorized work stoppages have been occurring with more frequency. However, with the invasion programs probably all set and with the need for all out production, even the smallest outlaw strike, it is said, could do more proportionate damage than is indicated by the length of the strike or by the number of men involved.

On the steel price front the OPA this week granted permission for the Geneva Steel Co., Provo, Utah, operating DPC owned facilities, to charge the same price on carbon plates f.o.b. Pacific Coast ports which was recently granted Kaiser's Fontana plant. The company was authorized to charge \$64 a ton f.o.b. Pacific Coast ports on carbon plates, which is \$11 a ton over the established ceiling price.

**A**T the same time, for shipments moving east from the Geneva plant, the OPA established Provo as a basing point on carbon steel plates at \$2.60 per 100 lb., f.o.b. Provo; rerolling billets, blooms and slabs, \$45.20 a gross ton, f.o.b. Provo; and forging billets, blooms and slabs, \$51.20, f.o.b. Provo. The excess cost of production at Provo is said to have been responsible for the higher-than-ceiling price approvals and there is already some speculation as to how the company could compete with Eastern interests in a normal market when the former begin rail and water shipment to the West Coast again. This, it is believed, will probably have a strong bearing on final negotiations when and if the Geneva plant is sold to private interests.

OPA Administrator Chester Bowles told THE IRON AGE this week that he was surprised that a member of Congress had introduced a resolution calling for investigation of the OPA Iron and Steel Branch. Mr. Bowles said it was his impression that OPA has held steel prices down and that only the finest spirit of cooperation has existed between OPA and its advisory committee.

• **STEEL DELIVERIES**—They are not getting any better and on most items the practical delivery dates are becoming even more extended. Bars may not be had before August with some makers quoting September and October. Hot topped bars are the tightest, with small ordinary steel bars the easiest. Sheet promises are fairly uniform among makers with the last quarter appearing to be the minimum time in which delivery can be promised. Some mills are further extended than that. Electric pipe in some cases cannot be had before August or later. Part of this condition is said to be the result of the drain on seamless mills for shell rounds. Alloy bar deliveries are becoming more extended after having been quite easy for months. Narrow plates are being scheduled for September with wide plates running as far ahead as November. There are differences between mills but the differential is not too marked, especially among the larger mills.

• **SMALL STEEL MILLS**—Smaller non-integrated steel plants who are said to be fearful of their chances of obtaining delivery of semi-finished steel in the third quarter because of steel pressure on the primary mills may find a "friend." The United Steel Workers of America, who a few weeks ago championed the economic plight of some of the smaller plants, may be counted on to use their pressure to keep the flow of steel going to the smaller mills. It has been noted in Washington that the union was accused of using the plight of the smaller mills as propaganda for their own interests. Aside from the labor factor, the small plants can put up a good argument on their own behalf pointing out that they, if anyone, can pull the galvanized sheet program through. Moreover they probably can lend considerable aid in the production of standard structural items and bar products while the primary mills are engaged in the shell program.

• **TINPLATE TIGHTER**—Orders have been good for tinplate and tin mill products with the result that volume is keeping pace with directives. The WPB planned to set up more than 850,000 tons of tin mill output for the third quarter. Some mills, however, found it impossible to make a commitment because of their tight position in sheets and plate. The shell container program and the expected increase in landing mat output may have been partly responsible for the inability of some to extend production later in the year.

• **IRON BALLAST**—With pig iron supplies approaching the place where they will be no more than in balance with demand, it is not surprising to see the eagle-eyed WPB crack down on the use of pig iron for ship ballast. Iron

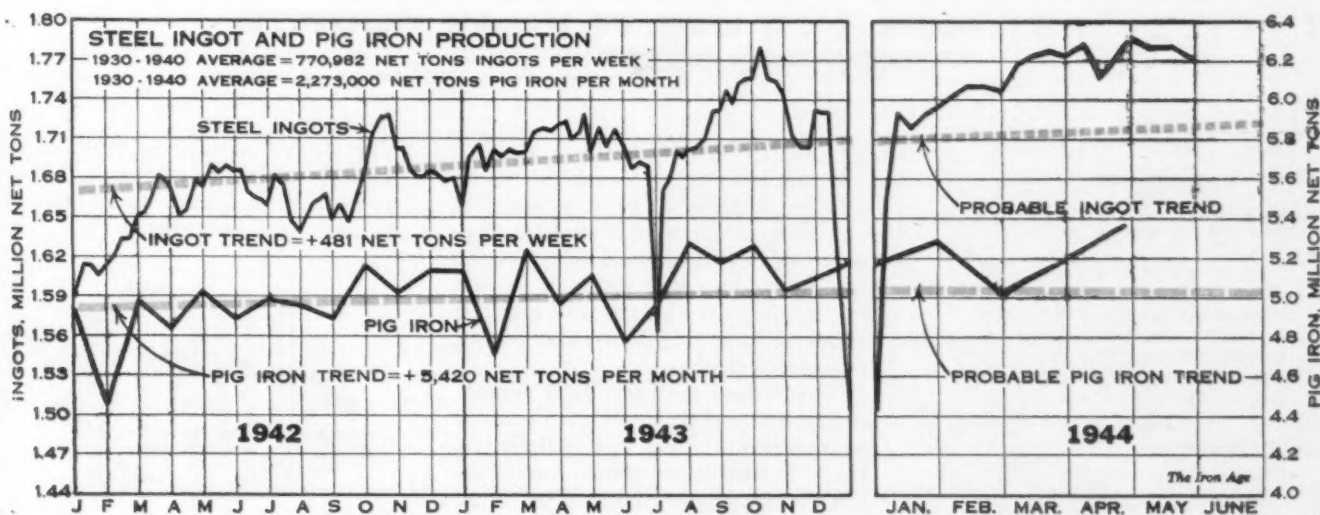
inquiries received by producers for use as ballast between May 1 and 31 must be reported to WPB, showing the tonnage sought, the dates of delivery, and the name and address of the prospective buyer. Early in the war considerable tonnage of iron was used as ballast but it is all needed for steel and foundry use at this time.

• **MACHINE TOOLS**—The idle and excess government owned machine tools listed in a recent mandatory report required by WPB will probably be held from the current market and doled out to "top urgency" munition makers who can not wait for new tools. Average tool buyers who normally would be told to take old tools may be asked to order new tools in order that the available tool backlog will not be decreased. It is said about 8000 tools were uncovered in a recent required listing.

• **FREIGHT TRACERS**—Many shippers have been filing requests for tracers the same day freight moves forward or immediately afterward on the assumption that such practice will expedite service. This practice has reached such proportions as to impose on the carriers what has been called an unnecessary burden and one they are experiencing difficulty in carrying under present conditions. The tracing of freight is defensible when a shipment fails to reach the destination within a reasonable time but is difficult to justify the starting of tracer before that time. The New England Shippers Advisory Board is appealing to shippers to limit tracers to instances of actual hardship or where there is definite evidence that a tracer is in order.

• **STEEL RATE DOWN**—Ingot production this week fell half a point to 97.5 per cent of capacity as Pittsburgh and Chicago operations declined one point to 95 and 101.5 per cent, respectively. Other production decreases were noted in Buffalo down two points to 104.5 per cent; Wheeling, down half a point to 98.5; and St. Louis, down 25 points to 74 per cent. Cleveland output climbed 14½ points to 98 per cent while in the West operations rose six points to 92 per cent. The only other district increase occurred in the East where the operating rate reached 107.5 per cent, 10½ points higher than last week. Continuing at the previous week's levels are Youngstown at 96; Philadelphia, 99.5; Birmingham, 97; Detroit, 100.5; and Cincinnati, 92 per cent.

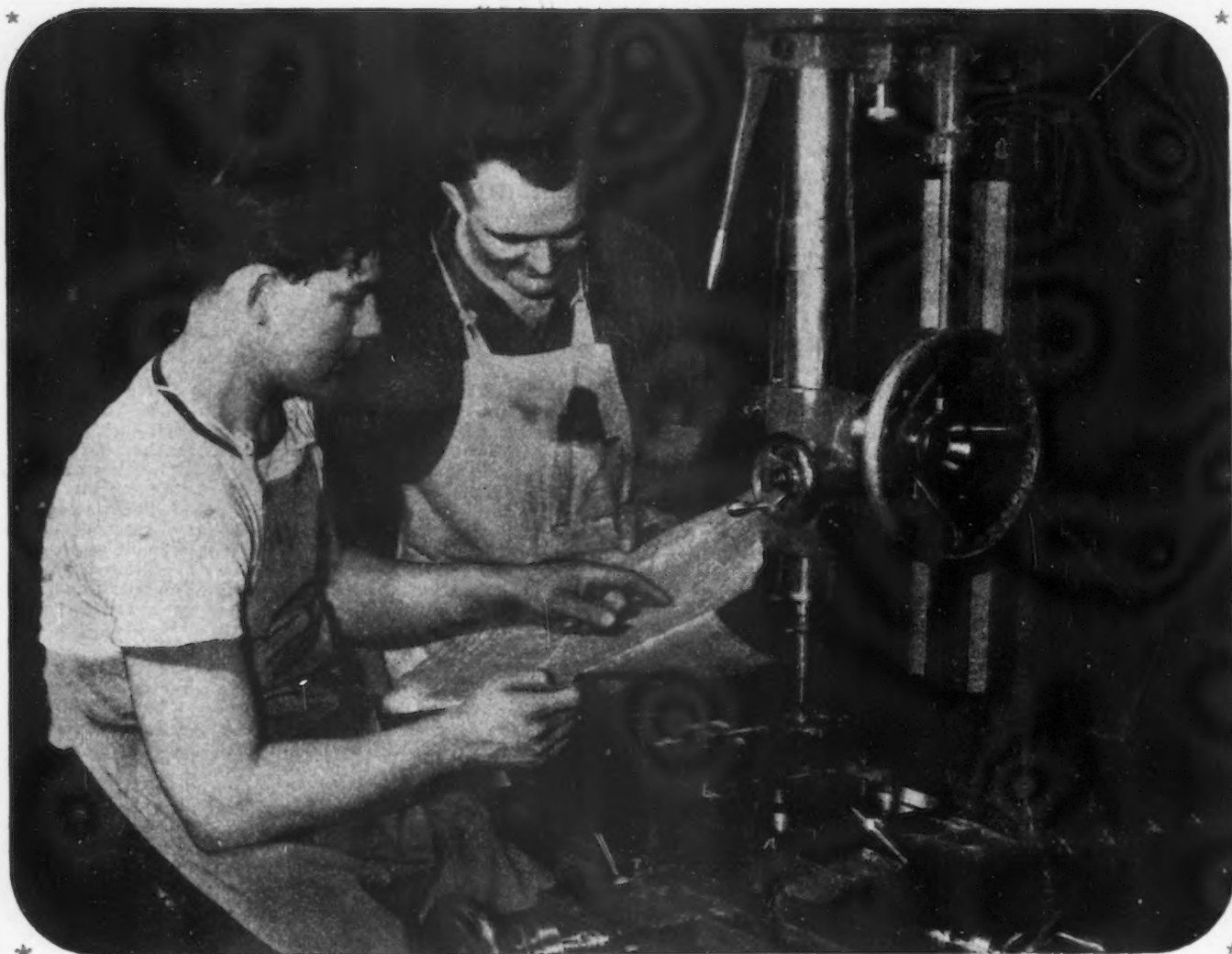
• **LAST TUBE PLANT**—When Lukens Steel Co. purchased Bethlehem property at Coatesville, Pa., it was the signal for the dismantlement of the last charcoal iron boiler tube plant in the country. Bethlehem had the property since 1923.



Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
May 18.....	96.0	102.5	96.0*	99.5	83.5	106.5	99.0	97.0	100.5	86.0	92.0	99.0	97.0	98.0*
May 25.....	95.0	101.5	96.0	99.5	98.0	104.5	98.5	97.0	100.5	92.0	92.0	74.0	107.5	97.5

\* Revised



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high speed steels, as well as the various high-tungsten and "moly" types of high speed steels. Call us in, any time, anywhere.



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# Survey Shows That Postwar Employment for Returning Soldiers Is the Major Problem of Industry

By S. H. BARMASEL  
Associate Editor

• • • Soldiers overseas want to return to blueberry pie, war correspondents write. In order to determine what employment and economic demands returning servicemen may make, 22 of this war's veterans who have been discharged after serving in the far-flung battle zones were queried. Although too few opinions were gathered to make this poll conclusive, the information gained is offered as a significant sampling of what may be expected when the bulk of the armed forces is released.

The ex-servicemen who were interrogated in New York and Chicago were chosen only because they had served overseas, had been medically discharged, did not suffer from any psychoneuroses and were back at work in industry. In all other respects, the selection was made at random, the men being contacted through the War Manpower Commission in New York and various plants, unions, and the American Legion in Chicago.

Opinions were gathered through personal interviews which entailed much probing of what these men were thinking. All questions, however, were standardized. Originally a questionnaire was used but this was found to be inaccurate since conflicting answers were frequently checked.

The foremost problem in the minds of these men is that of jobs. Sixteen insisted that veterans were entitled to job preference. Most were vehement about this, some foreseeing a resurgence of gangsterism and racketeering if these jobs were not forthcoming, while several others predicted another "March on Washington" that would not be halted as easily as the one staged by the previous World War veterans. One veteran pointed out that "ex-servicemen will get what they want. There are too many to get pushed around."

All 16 in supporting their claim for job preference said that while they were facing the privations and dangers of war, civilians were able to save some money, which, of course, they were unable to do.

When asked whether Negro veterans should have job preference, two refused to answer admitting prejudice, one said, "absolutely no," 13 thought there should be no difference in treatment while the others said they had not thought about it and hence could not give a definite answer.

As for the six who did not believe that veterans should have job preference, they defended their stand by saying that it was the Selective Service boards that determined who was to fight and who



was to remain. All six expressed in their various ways that the welfare of the nation depended on jobs for all; that conditions would be just as chaotic and fraught with danger if any group in the United States suffered widespread unemployment.

The automotive industry was expected by those questioned to absorb the greatest number of workers with the building trades, steel and consumer industries following closely. All wanted private enterprise to provide jobs but three thought the government should supply jobs in civil service if industry defaulted. Two would give industry about eight months to prove its ability to provide jobs and then, should private enterprise fail to do so, the government should by subsidies maintain these industries which could not absorb sufficient workers. Two thought that if there were insufficient jobs, the 30-hr. week should be tried, while four suggested an emergency relief program. They suggested increased unemployment and old-age benefits.

In order to be fitted for jobs, every veteran polled wanted the rehabilitation service extended so that not only those permanently disabled could take advantage of this program, but youngsters who had been inducted before getting any work experience would benefit by it as well as any others who wanted trade training. One suggested that not only should

government conduct such a service, but that industry should assume the responsibility of training men in necessary skills so that those demobilized could be more readily absorbed into civilian life.

All were agreed that demobilization should be gradual since they feared the simultaneous release of millions of men would result in wage cutting as these veterans competed for jobs. Every New Yorker believed that the number of available jobs should be the determining factor in the release of men, although in Chicago, only one concurred with that view. Each thought that overseas fighters should be brought home and the Army of Occupation made up of those who remained in the United States. Length of service, dependency status and age were other factors which these ex-servicemen thought should rule demobilization.

When asked about current wage rates, there was complete unanimity in pooh-poohing the concept of war workers' swollen purchasing power. Although 20 admitted that during their period of military service they believed newly rich war workers were squandering their unaccustomed wealth, they now were of the opinion that the rise in the cost of living has equalized wage increases while three thought wage earners were actually better off before the spurt in war production. Pointing out that most of the money was made on overtime,

six said that many veterans were no longer physically fit to earn such "blood money."

Twelve veterans were convinced that women should not work in factories after the war, although one feared that management would be reluctant to get rid of women employees since "they are more conscientious and easier to push around." Five thought that women should be permitted to compete with men for factory jobs getting equal pay for equal work if they wanted to, but thought that in most cases the work was too hard for them.

For job protection, 20 said unions were good things since they were the only voice an employee possessed. Of this number, two called unions "a necessary evil" and six felt their political power should be curbed. Two were definitely opposed to unions, one saying they should have no place in the economy and the other that unions were only for "dumb guys" since the others could take care of themselves. Although opposed to wartime strikes, 14 thought unions should keep their most potent weapon after the war.

As for the closed shop, 13 stated their favor of such a system since it afforded the best worker protection and all who benefit by a union's presence in a plant should share in dues payment.

All polled favored government audit of union financial statements.

In favor of the creation of a post-

### *"I Want a Fair Deal," Young Veteran Insists*

JB, 20 years old, saw action in North Africa, Italy and Sicily. He was discharged because of a lung condition.

"What I want is a fair deal—to get enough to make a living. A war worker does not make enough to live on except through overtime pay, in New York anyway.

"An employer must look upon an employee as human instead of a machine. He must have rest periods and vacations. If an employee gets these conditions, he could produce more.

"There should be a stabilized scale of pay so that all workers doing the same job would get the same pay. Either government or the unions should see

to this. There must be some kind of planning so that the cost of living and wages will have some relation.

"The government must control the currency so that the money a soldier gets when he leaves the Army will be able to buy what he needs. For at least two years after the war, there should be price control of food, clothing and other essentials.

"Unions should control working conditions and the War Labor Board should continue in existence after the war. If not either labor or industry will get too powerful.

"We should not go back to plowing under. If a product cannot be sold, a use must be found

for it.

"There should be a stagger system for contract terminations so that all the people won't be laid off at once.

"We should be prepared for another war and not be afraid to offend other countries because if we are well prepared, these countries won't do anything if they are offended.

"If industry does not plan to absorb the demobilized army, the reaction will be very drastic and industry will lose its leading position in this country. A soldier has been taught to kill and after two or more years of that it's pretty hard for him to return to normal. We don't like being pushed around."



**"Unions May Be Good or Bad—Seniority Rules Unfair"**

JLD, age 33, served in the Aleutians with the Air Force. He was later discharged because of a broken back.

"What I did, I did not want to do and therefore should not rate better privileges. The workers in essential industries did a good job and were equally needed and should not be discriminated against. When jobs become scarce, veterans should not be given better privileges because the government rehabilitation program provides a training they would not otherwise have had.

"Unions may be good or bad. They may cause dissension and may impede men from doing

their best because of a sense of security. Unions may also keep a man from getting a deserved promotion because of seniority rulings.

"Wartime overtime is inefficient because too long hours slow employees and cause absenteeism. Two week vacation periods should be made compulsory by law.

"Many soldiers will go abroad again to work in a civilian capacity.

"Women should not be made to work the same long hours as men but where they do the same work, they should get the same pay. The job should be classified, not the person doing it.

"Price control should not be relaxed because right after the war people will go on a spending spree and cause prices to soar.

"There should be a publicized going wage rate so that a person could know what he is entitled to and what he could get. This could be operated under an agency equivalent to the War Labor Board.

"The government should help industry reconvert since it forced industry into war production.

"I don't know how it can be done, but the man who replaces a worker going into the armed service should have some job protection."

war agency with functions similar to the WLB since it would diminish the number of peacetime strikes and according to two opinions prevent either labor or industry from getting too powerful were 13 veterans. Nine rejected this plan; five thinking labor and management could negotiate without the necessity of a disinterested body, two fearing the possibility of political or money control of such an agency, and two wanting the dissolution of all wartime bureaus.

All but two wanted to see publicized the going wage rates for all job classification so that any one would know what were fair wage scales in a given community. This, they thought, could be accomplished through the cooperation of unions and the WLB or its equivalent.

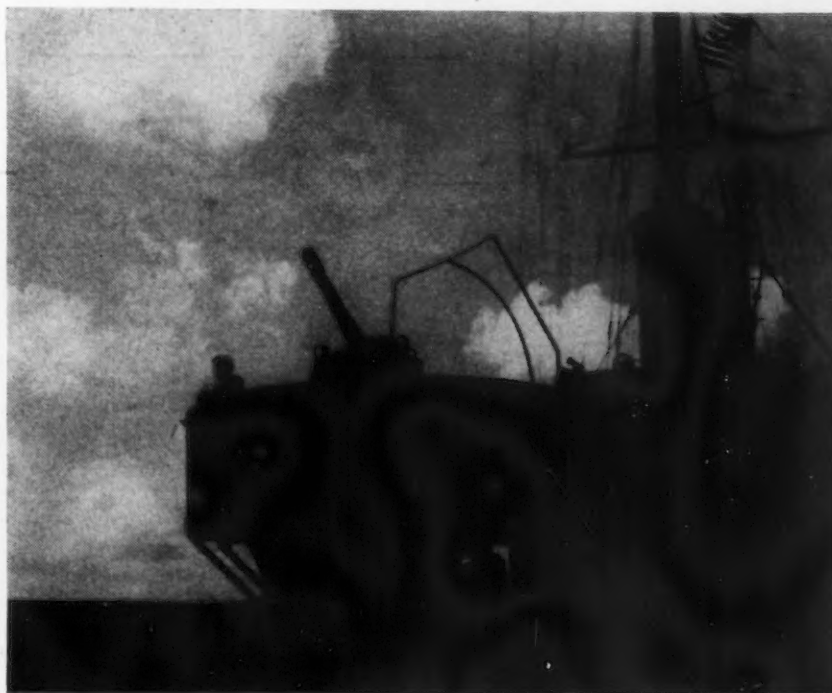
As to the future of government owned plants, two favored continued government operation; one because the plants could serve as a yardstick of actual production costs, and the other because in these plants the government could undertake necessary projects which private industry might reject if the profits accruing therefrom would be insufficient. One discharged soldier thought the public should stand the loss involved since the plants were erected for the national welfare. The remaining 19 did not want the government to compete with private enterprise and therefore thought industry should be given the opportunity to purchase these plants. One suggested that several of these plants might function as expanded ar-

senals but in no case should these mills or factories become commodity producers.

All wanted the United States to continue its preparedness program and 20 favored postwar conscription. To help maintain the peace and domestic employment, 18 favored liberal

foreign trade with the extension of necessary credits. Four wanted all foreign trade on a cash-and-carry basis. Eleven thought the government should control exports in that it would be an extension of foreign policy and as nations appeared to become hostile, all trade would cease.

**SOLITARY LOOKOUT:** *He watches the seas for signs of the enemy from the bridge of a Coast Guard combat cutter somewhere in the Atlantic. Behind him is the gun all set to do its job if enemy airplanes are sighted.*





## Geneva Steel Gets Price Relief; Basing Point for Some Items Established

### Washington

• • • The Geneva Steel Co., Provo, Utah, operating DPC owned facilities, has been granted permission by OPA to sell steel at prices above the established ceiling levels. This authority was given last week in order No. 71, Revised Price Schedule No. 6, because of the inability of the company to produce steel at costs which will allow it to sell at the ceiling prices.

On carbon plates, the company was authorized to charge \$3.20 per 100 lb., f.o.b. Pacific Coast ports. This \$34 a ton price is the same as that previously fixed for the Kaiser plant at Fontana, Calif., and is \$11 a ton over the established ceiling price of \$53

per ton or \$2.65 per 100 lb.

Above ceiling prices per gross ton, f.o.b. Pacific ports also were established for the Geneva company for rerolling quantity billets, blooms and slabs, at \$58.64 and for forging quality billets, blooms and slabs at \$64.64. The established ceiling at Pacific ports on rerolling quality billets, blooms and slabs is \$46 and on forging quality billets, blooms and slabs it is \$52.

On sales made in areas governed by basing points other than the Pacific Coast ports, base prices not in excess of the following prices, f.o.b. Provo, may be charged by Geneva: Carbon steel plates, \$2.60; rerolling quality billets, blooms and slabs, \$45.20; forg-

ing quality billets, blooms and slabs, \$51.20. Under the schedule Provo becomes a basing point on shipments moving east from the Geneva plant.

Extras filed with the application for relief may be added where applicable, as may the customary switching charges at Pacific Coast ports. Delivery prices on the Pacific Coast must be calculated by equalizing of freights with the governing Pacific Coast ports.

The excess cost of production at Provo which necessitated the increase in prices arises primarily from the high wartime construction cost of the new plant. When this excess cost of construction is charged as depreciation, it offsets the ability of a company to produce steel economically with modern equipment.

• • • Central Iron & Steel Co., Harrisburg, Pa., under order No. 70 of RPS 6, is now permitted to sell plain carbon steel plates, base grade, at an increased maximum base price of \$2.50 per 100 lb. f.o.b., the applicable governing basing point, except that in the case of carbon steel plates made to Navy Specification 48-S-5 the maximum base price is \$2.20 per 100 lb.

Old Dominion Iron & Steel Works, Inc., Richmond, Va., under Order No. 67 of RPS 6 is permitted a general increase on the principal types of staybolt iron produced by the company. The schedule is shown in the order.

Knoxville Iron Co., Knoxville, Tenn., under Order No. 68 of RPS 6 is permitted to sell, offer to sell, and deliver to the Chemical Warfare Service of the U. S. Army the 102 net tons of special carbon steel bars delivered on contract No. W-41-404-CWS-473 at an increased price, including all extras, not in excess of \$136.90 per net ton f.o.b. Knoxville.

Milton Mfg. Co., Milton, Pa., under order No. 69 of RPS 6 is permitted to sell merchant bars at an increased base price not in excess of \$2.75 per 100 lb., f.o.b. mill, Milton.

BLIMPS IN REVIEW: Blimps of the "L" type soaring high over lighter-than-air hanger at U. S. Naval Air Station, Moffett Field, Calif.



### Inland Profit Per Net Ton 31% Below 10-Year Average

• • • Net profit per ton of steel ingots produced by Inland Steel Co. in 1943, \$3.03, was 31 per cent less than the company's yearly average for the past 10 years, a report issued to employees last week showed. Thus, even though Inland lead all group I steel companies whose earnings could be computed on this basis, rising labor and materials costs are shown to be taking their toll.

The report shows that although prices of finished steel are essentially the same as those of 1938, a year of poor business, cost per gross ton of heavy melting scrap has advanced 34 per cent from 1939 to 1943, coal 39 per cent, ferro-manganese 35 per cent, and zinc 50 per cent.

Based on ingot production, Inland's 1943 rate of operation was 106.6 per cent of rated capacity compared with 102.3 per cent for 1942.

## "Must" Production Programs Lag Due To Manpower and Component Shortages

### Cleveland

• • • So-called "must" production programs in this area are reported suffering threatening production losses due to manpower shortage, according to George Moore, vice-chairman of the Area Production Urgency Committee. Earlier reports which indicated that only about 90 plants in the area might suffer, have now been superseded by tentative figures indicating that at least 220 plants are falling behind in schedules for this reason. Steel shortages or delayed steel deliveries have not entered the situation yet, Mr. Moore stated, but shortages of some components are having an adverse effect on production.

Where mainly foundries and forge shops were hit by manpower scarcities in the past, this ailment has now branched to include plants occupied with nearly every "must" production program on the list. "Must" production programs should in this case be separated mentally from those carrying "emergency urgent" military ratings.

The problem evolves particularly from the fact that the Cleveland area is so well fitted to take on many of the heavy urgency programs that these have been telescoped into the available capacity here with a definite overloading of facilities and manpower. Referrals by USES have channeled much of the available or shifting manpower directly to the plants concentrating upon urgency work with the result that the mere "must" programs are being seriously slighted for labor.

Super-imposition of urgency contracts upon shops already filled with must work has also had the effect of simply delaying production on the less important programs which now show up definitely delayed.

The programs suffering most here include: Farm implements, parts of the aircraft component program, mica, certain chemicals, truck parts, trailers, some hand tools, small tractors, road equipment parts, certain railroad needs and most programs having to do with the civilian economy.

The seriousness of the matter cannot be recognized until it is realized that this area supplies the components and hundreds of essential parts for nearly every major production program in the nation. If the production

volume is permitted to fall to low levels here the ultimate success or scheduling of the national programs must sink to the same levels.

Public apathy to the necessity for production is charged with part of the responsibility for the lowered production rate here. Women are leaving war industries at a rapid rate and new recruiting of women has met with little success recently.

A number of factors are expected to be of assistance in the manpower supply situation here within the near future. Employment ceilings, Mr. Moore said, are expected to be applied on non-essential industries here by June 1 and the same measure taken

with essential industries beginning July 1.

Controlled referral hiring of all men between the ages of 26 to 37 which will force this age group into war work and keep its members there through USES methods is being planned now.

The area is also receiving about 700 disabled or otherwise discharged soldiers back into employment every month and referral hiring is diverting this manpower where best adaptable.

### 100 Car Order Goes to Mount Vernon Mfg. Co.

• • • Western Pacific Railroad Co. has awarded a contract for 100 box freight cars to Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill., a subsidiary of H. K. Porter Co., Inc., Pittsburgh.

**HIGH SEAS FILLING STATION:** Somewhere on the Atlantic, this Coast Guard combat cutter prepares to fill its fuel tanks from a British tanker. A line has been fired over the tanker and an oil hose has been passed from the cutter. Such a fuel rendezvous saves much travel time to port.





## Voorhees Attacks Union's Aim to Share in Tax Carrybacks by Wage Increase

### Washington

• • • In a two-fisted statement to the WLB Steel Panel on May 23, Enders M. Voorhees, chairman of the finance committee of the U. S. Steel Corp., rapped the "illusion" of the CIO-USWA's wage demands and the "delusion" that increased wages can be paid out of carry backs provided by the tax laws.

He showed that the 17c. per hr. wage demand, and other hidden wage demands if met would result in deficits and in confiscation by the union of the company tools belonging to the owners of the U. S. Steel Corp. The guaranteed wage demand, he said, would vary in cost from \$582,000,000 to over \$1,000,000,000 with the corporation paying these sums out of pocket for work not done. The alternative to this would be to build up "reckless" inventories of unknown value with all of the attendant uncertainties of ever selling them.

Mr. Voorhees' remarks climaxed a week of testimony on the guaranteed annual wage by other industry representatives and contained the first discussion of union claims to the carry back as a source of increased wages. He repeatedly brought home to the panel that the union is really asking for complete abolition of the system of free competitive capitalism in its demands.

Mr. Voorhees described the carry back provision as a wisely enacted provision by Congress to offset in part postwar losses. There is no mystery about this carry back provision, Mr. Voorhees reminded the panel or about the provisions of other tax laws per-

mitting corporations to adjust their gains and losses over a period.

Opened by H. W. Boal, vice-president and treasurer of the Andrews Steel Co., the guaranteed annual wage phase of the case was sharply criticized as impractical. Mr. Boal said that Andrews cannot guarantee an annual wage. John G. Gall, Washington attorney, challenging WLB's power to grant the USWA demand, said that it was a matter that could not be decided by the WLB, and Bradford B. Smith, New York, U. S. Steel Corp. economist, said that the demand "must by mere observation be viewed as fantastic, no matter what the motive which prompted it."

Mr. Andrews said that because the position of his company is representative of many similar situations, he was presenting the case as part of the general presentation. Far from being able to guarantee an annual wage, Mr. Andrews said that his company cannot even guarantee that it can continue to give employment to the present number of workers and in support of this contention he cited figures showing that during the six months ended March, 1944, the company suffered a loss of \$449,064.36. The company, however, he said hopes to operate its plants at somewhere near their capacity of 400,000 tons of steel ingots a year.

"Our efforts would, however, be rendered futile," said Mr. Boal, "if the government should yield to the pressure politics behind the union's demands in this case. There are many other companies in the steel industry which are in a similar position."

Mr. Boal said that Andrews has not asked and does not intend to ask for government subsidies "to enable it to meet the unreasonable and unrealistic demands of the union in this case." He said that he thought he expressed the sentiments of 20 small companies "when I say, with all due respect, let management direct its business, without interference from commissions set up to promote the pressure politics of the union."

Mr. Boal said that the union demands for a 17c. per hr. wage increase and the elimination of the long established geographical wage rate differentials would mean for Andrews a total wage increase of 23.5c. per hr. and would increase total conversion costs by another \$4.47 a ton. Other demands would mean additional costs, which, Mr. Boal said, is a "new and novel method of saving small steel from disaster and bankruptcy."

Mr. Gall described the union demand for a guaranteed annual wage as misleading. He said that the proposal is not for an annual wage but for a minimum weekly payment for the duration of the contract, whether or not any work is performed.

Mr. Gall pointed out as other steel representatives did that the steel industry is as much concerned over the matter of more stabilized operation and employment as are the workers.

Mr. Gall cited seven points in addition to his contention that a wage increase would violate the Stabilization Act to support the position of the industry respecting the demand for a guaranteed annual wage. He said that Congress had not authorized the board to (1) impose such a condition which . . . would be confiscatory; (2) require payment for work not done; (3) impose conditions which are not customary in collective bargaining contracts; (4) impose conditions which would be unfair and inequitable to the employer under the circumstances of the particular case; (5) issue orders which are to be or become effective in the postwar period; (6) impose conditions which would destroy the employer's undoubted right to sever the employment relationship at will, subject to any positive limitations of specific laws and (7) promulgate orders or regulations which are legislative in character.

Mr. Smith in arguing against the guaranteed annual wage declared that the union is trying to override the facts of customer buying and is asking WLB to order "a private postwar storm cellar" for steel workers at the expense of others.



• • •  
**NAZI CANNON PLANE:** This Ju 87, one of Germany's newest warplanes, carries two 37 - mm. cannon which can be used effectively as an anti-tank weapon. This is believed to be the first time German aircraft has carried such heavy armament as standard equipment.  
 • • •



## Strikes Add to Already Heavy Management War Production Burden

### New York

• • • Faced with manpower shortages, hot weather, breakdowns, turnover, fatigued workers and being urged on to even higher war production records, the metal working industry in the past week seemed destined to deal with more and more outlaw strikes. Whether or not the near revolt at the steel union's convention at Cleveland recently when demands from the floor to revoke the no-strike pledge is symptomatic of expanded labor troubles this year remains to be seen.

Philip Murray in crushing the revolt of some of his steel workers, was probably more mindful than anyone else as to the effects of bigger and longer work stoppages. So far most of the "quickies" have been short lived and have not cost much in production. However, with the invasion programs probably all set and with the need for output production, even the smallest outlaw strike can do far more damage than can be gleaned by the length of time or the number involved.

Indicative of the seriousness of even short work stoppages were the 33rd, 34th, and 35th strikes since Jan. 1, 1944, at the Gary plant of Carnegie-Illinois Steel Corp., this past week. These stoppages disrupted various phases of operations from the ore to the finished steel product. In this series of strikes more than 2000 tons of pig iron were lost as well as 1500 tons of ingots. Such a loss, however, is by no means indicative of the total loss in production. Time is consumed starting operations up again and the real loss according to observers is found in what could have been made if these unauthorized strikes had not happened. Some responsible steel officials are seriously wondering just how much of the outlaw striking stems from the WLB hearings on the steel wage question.

In the Birmingham district in the past week five strikes, four in the coal mines and one in the Pullman Standard Car Mfg. plants, caused loss in production. About 1900 men were involved, valuable coal lost and war production was held up. Last week a strike at the Youngstown Sheet & Tube Co., at Youngstown, caused cessation of operations at the company's wire rod mill. Again the causes of the dispute were vague or not apparent.

More than 800 men walked out at the Murray-Ohio Mfg. Co., Cleveland, last week over the discharge of two union stewards. About 20 employees staged an unauthorized walkout last week at Westinghouse Electric & Mfg. Co. foundry at Cleveland. More than 100 men walked out at a Bethlehem Steel Corp. plant at Bethlehem with the union official admitting that the strike was unauthorized.

At Detroit it was reported that unusual action was expected momentarily in order to crack down on unauthorized strikes involving the United Automobile Workers. An administrator for the Chrysler Highland Park local was to have been named this week with the suspension of local officers being anticipated. The action was said to be imminent because of the support given by the local of a strike which sent 6500 men home from the Chrysler plant and left 5000 idle

in other plants dependent on the Highland Park works.

The strike at Highland Park, which occurred in the past week, began after the company had discharged 16 men including two shop stewards. According to reports insurgent elements were in control of the union for the time being when a mass meeting was held May 21. Efforts of the international officers were thwarted by the rank and file, hence the expected appointment of an administrator for the local. Although not new, the latest action of the international office is unusual. The administrator would have charge of the local for 60 days after which new officers would be elected.

The number of strikes that are coming to public attention are probably no more than a portion of the whole since many last only a day or two and are over before they are reported. Union officials stick to the claim that the "no-strike" pledge is not broken when unauthorized work stoppages occur.

## Coal Labor Rulings Hikes Steel Costs

### Washington

• • • WLB's approval of portal to portal pay in the soft coal case on May 20 added another cost to steel production and provided a further argument to steel companies seeking price adjustment from OPA. The WLB decision covered captive as well as independent mines.

The decision, after more than a year of controversy, was approved by a vote of 10 to 2. Also approved was the contract provision for payment of

\$40 to each miner in settlement of the union's retroactive portal to portal claims from April 1 to Nov. 3, 1943.

The bituminous agreement now provides for a basic rate of \$8.50 a day, including travel time, and calls for a work day of 8¼ hr., replacing the 7 hr. shift "at the face" in the agreement which expired last year. The basic pay in the former agreement was \$7 a day. The increase of \$1.50 a day was made to cover travel time of 45 min.

**JEEPS FOR FARMS:** Manpower and machine shortages are being relieved on some farms by use of Army rejected jeeps. Here is one being used in Pulaski County, Ark.



## Foundry and Forge Industry Labor Problems Taken Over by WLB

### Washington

• • • The "desperately acute" needs of the foundry and forge industry, as WPB Chairman Donald Nelson described them, have been tossed in the lap of the already extremely busy WLB. Given instructions by Economic Stabilizer Fred Vinson to give prompt attention to all wage cases in the industry, WLB through its national and regional boards has taken up the job of "surveying" some 300 plants which, Mr. Nelson said, are suffering from actual and expected manpower shortages which, unless corrected by the addition of 20,000 unskilled and semi-skilled workers, will result in crippling essential military production.

The case was taken to Mr. Vinson

after two "emergency" conferences between WLB and a committee of organized labor representatives who said that if the wage inequities are adjusted and working conditions improved the chief stumbling block will be removed in the recruitment of the additional workers necessary to meet a 20 per cent higher war production by fall.

After approving the steps taken on the wage question and pledging the unions to intensive cooperation with the area and national task committees of the WPB, WMC and procurement agencies of the armed services, the labor committee reluctantly agreed that the government should proceed with preliminary arrangements for importing Mexican nationals.

## Carnegie-Illinois Acquitted on Two Steel Plate Record Indictments

### Pittsburgh

• • • The Carnegie-Illinois Steel Corp., U. S. Steel subsidiary, was found not guilty of falsifying plate test records in Federal Court here on May 23. The jury rendered a sealed verdict on May 22 which was read in court May 23. Prior to giving the case to the jury Federal Judge R. M. Gibson directed the jury to find the defendants not guilty on the charge of destroying plant inspection records which was one of the two indictments. This directed verdict was the result of a defense motion that this indictment be dismissed.

The "plate" case had been in Federal Court here since May 1 and involved considerable testimony concerning the testing of plate steel for the various governmental agencies.

The charges made by the government grew out of a Truman investigation held some time ago. In court one of the investigators under cross examination admitted that he entered the plant on the basis that he would like to see steel made. While on this tour he obtained certain information which lead to the government's charges.

Before beginning the final arguments, defense attorney Elder W. Marshall renewed a motion to dismiss the indictment charging destruction of the records of tests of steel that was shipped to the various government procurement agencies. In granting the motion, Judge Gibson said he would instruct the jury to find the company "not guilty" on that count.

When this occurred, Robert L. Wright, special U. S. prosecutor, with-

drew one of the numerous counts in the other indictment, which charges falsification of records on various heats of steel, on the grounds that the government had erred in including it in the indictment.

Attorney Marshall stressed that if the company made mistakes identifying steel shipments from the Irvin Works, these were honest mistakes made under pressure of war created demand for more steel. He requested the jury to decide if the alleged sub-specification steel was sent from the plant with intent to mislead or if it was sent out "under pressure of work with best intentions to get the steel out in time of war." He pointed out that there has never been any testimony brought in by the government that anyone had "lost a dollar, any ship had failed, that there was any loss of life, or that anyone was hurt" because of Carnegie-Illinois steel.

## OPA Head Surprised at House Investigation

### Washington

• • • OPA Administrator Chester Bowles told THE IRON AGE on Monday that he was surprised a member of Congress had introduced a resolution calling for investigation of the OPA Iron and Steel Branch. Mr. Bowles said it was his impression that OPA has held steel prices down, and that only the finest spirit of cooperation existed between OPA and its Iron and Steel Advisory Committee.

The resolution, introduced by Rep. Anton J. Johnson (Republican of Illinois) on May 18, would require investigation of whether "1—undue influence has been exercised over said branch by the Steel Industry Advisory Committee; 2—upgrading of products manufactured by the steel manufacturers has been authorized and thus granting price increases that are not immediately apparent; and, 3—these and other activities have been detrimental to the fabricators, particularly small business."

The House Rules Committee, it is understood, has not received a request for hearing by Mr. Johnson, and there are more than 20 hearings ahead of the Steel Investigation Resolution.

This fact raises the question whether the resolution will get a rule for consideration by the House before adjournment next month, although under Rules Committee procedure a hearing on the measure could be accelerated if the chairman of the committee thinks it proper.



POSTWAR AVIATION: Many aircraft manufacturers are announcing their postwar planes for the public. Here is helicopter of the Andrew J. Higgins interests.



## Farm Implement Program Said to Be Lagging From One to Eight Months

### Cleveland

• • • Two pronounced shortages have the 3½ state Cleveland area farm implement producers from one to eight months behind scheduled production, according to C. R. Griffiths, Production Service Manager of the WPB district. These are a manpower shortage and a shortage of components. The difficulty most important in causing both shortages appears to be the fact that farm implements are "must" programs but do not compare in priority with the newer "emergency urgent" military programs which are flooding the area.

So far, steel shortages or delayed steel deliveries have not caused any concern, however. The greatest single shortage is occurring in malleable castings although components of many types including motors are in short supply due to the demands of more urgent programs. Since farm implement plants have not been granted any special draft protection or urgency rating for material, both shortages have begun to clamp production seriously.

Recent reports show that 34.1 per cent of the farm implement producers in the area are on schedule but an ominous 65.9 per cent are far behind with 10.8 per cent not having completed any finished units.

Despite difficulties, Mr. Griffiths stated that the program for the fiscal year ending June 30 should produce better than 85 per cent of quota. An urgency rating is anticipated for next year when some of the current top urgency military programs are expected to be waning.

Most critical items in farm implements are reported to be cultivators and weeders, harvesting machinery, haying machinery, small tractors, sprayer and dusters for the 1944 season.

If steel is actually available above the needs of the big munitions programs the farm programs should not suffer from this shortage, according to WPB allocations. Steel allocations by WPB to the farm implement makers for the second quarter included 326,144 tons of carbon steel and 22,945 tons of alloy. Third quarter allocations are 295,341 tons of carbon and 18,623 tons of alloy. Rolling capacity and preference may, however, alter steel supply during the

third quarter when munitions demands are expected to pyramid.

Labor for farm implement assemblers is expected to cause little trouble since many in this area are

### Russia Plans 272 Scientific Expeditions

• • • A Soviet home broadcast reported May 12 by United States Government monitors said that 272 scientific expeditions, organized by groups affiliated with the Academy of Sciences of the U.S.S.R., would set out in the near future to explore the Urals, the Far East, the Republics of Central Asia, the Caucasus and the Far North.

According to the Moscow broadcast, one group will "investigate the sources of iron, manganese, cobalt and chromium" in the Kazakh Soviet Socialist Republic in central Asia, and another group the "sources of zinc and rare metals" in the Ural Mountains.

In addition, the Far Eastern Base of the Academy of Sciences is scheduled to send a geological expedition into the "deep regions" of the Siberian maritime areas, the broadcast said.

located in or near small towns and returning soldiers are expected to be channeled into this work. Foundries and component manufacturers for the industry, however, may continue to be a bottleneck.

The WPB is trying to assist all possible by up-rating where possible, locating substitute materials in the case of components and locating new facilities.

### LCM-3 Tank Lighter Viewed In Production At Ohio Plant

#### Cleveland

• • • The press last week was permitted a view of one of the Navy's No. 1 priority jobs—the LCM-3 tank lighter under construction on a continuous assembly line at the Warren City Mfg. Co., Warren, Ohio.

Capt. R. T. Hanson, USNR, inspector of naval material and supervisor of shipbuilding for the Cleveland district, pointed out that the Navy had only 20,000 landing craft on the first of the year and that 80,000 were

needed, thus placing this type craft in a top priority spot on the Navy construction program.

The Warren City company is turning out about 15 completed LCM-3 barges per month. Each barge is about 50 ft. long, 14 ft. wide, weighs about 25 tons and is powered by two GM diesel engines. Built almost entirely of plate, the subassemblies are first welded together in an upside down position to permit down hand welding and later welded into the finished hull in an upright position.

After the hulls have been completed in an upright position which permits easy access to the inner structures and deck surfaces, again with a down hand welding technique, the engines are installed and the landing ramp attached to the front end.

What the company terms an "inland ocean," actually a 34,000-gal. tank, is used to float the barges after all installation work is completed and here the vessel gets its first sea test and the motors given a trial run.

The plant of Warren City Mfg. Co., while operated by Joseph W. Frazer, who has with him a number of automotive executives, is owned by the Navy and was built at a cost of over \$9,000,000.

### Diesel Installations in Naval Craft Break Record

#### Chicago

• • • Combined horsepower of diesel engines being installed in naval craft late last year exceeded that of steam turbines for the first time in the Navy history, Capt. Lisle F. Small, assistant head of the shipbuilding division of the Navy Bureau of Ships, told a national meeting of the Society of Automotive Engineers last week.

Diesel engine performance in the Navy is most gratifying, he said. Current experience was indicated as providing some guideposts for future engineering.

Anticipated, as a result, is wider use of the two-cycle engine type rather than a four-cycle unit. Use of a high-speed blower to supercharge four-cylinder engines, said Capt. Small, "appears inevitable." He foresaw more effort concentrated on the development of the opposed piston type of engine, and the ultimate abandonment of poppet valves.

The officer indicated that considerable attention is being given gas turbines as a ship propulsion means, but that their place is still far from determined.



## New War Department Standard Termination Procedure Expected to Speed Contract Settlement

### Washington

• • • In an effort to speed the submission of claims from war contractors whose contracts have been terminated, the War Department on May 17 issued the first "Standard Termination Procedure." After May 15, Army contractors can set down on concise printed forms all facts necessary to present information to bring about a quick settlement of terminated contracts with the War Department.

The new forms, because they are uniform throughout the different procurement branches of the Army, will soon eliminate any irregularities and delay. The forms, nine in number, carry simple but complete printed instructions so that contractors may clearly understand what is needed in order to speed their cases.

Prime contractors will require less time in approving their sub-contractors' claims when the new forms are used. When termination facts, now properly codified by the new standards, reach the Army office where the contracts are settled, auditing and checking will be substantially simplified and reduced.

The forms are issued in three main divisions. These are: 1—A Settlement for Large Claims, consisting of the contractor's proposal for settlement and separate supporting schedules for listing termination costs and inventories. 2—A Combination Short Form for Claims Amounting to \$10,000 or less, listing the contractor's proposal, costs and inventories on one form. 3—Small claims which come under \$500 in value, a third short form is issued upon which the contractor

simply states his proposal for settlement.

These forms are to be used in connection with all fixed price supply contracts terminated after May 15, 1944. In exceptional cases, if the forms fail to present the essential facts or are not sufficiently applicable, the contracting officer may authorize some other method of presentation on forms specially designed for the purpose. Contractors having contracts terminated prior to May 15, 1944, should also use the forms, where proposals have not yet been prepared on other forms. All sub-contractors should use the standard forms to the greatest extent practicable.

Contracting officers are authorized to permit the omission of data called for by the standard forms in particular instances to the extent that such data are not applicable, are not reasonably obtainable, or are not deemed necessary for the adequate substantiation of proposals for settlement or for disposal of property; and to require additional data when necessary for settlement.

The forms are designed to present information required for settlement of terminated contracts as well as for disposal of property resulting from such terminations. In connection with property disposal, contractors and contracting officers will be guided by the general policy that, without delaying the final settlement, surplus raw materials and work in process should be finally disposed of, to the extent practicable, promptly after termination so that delivery of property or passing of title to the

government will be unnecessary. Where the settlement proposal is less than an amount to be prescribed from time to time in regulations, all property involved should normally be finally disposed of so that no delivery or passing of title to the government is involved.

The following outline indicates the individual forms provided and when they are to be used:

1—Where settlement proposal, before disposal credits, is \$10,000 or over—Long Form Procedure.

a.—Form A-1, Contractor's Settlement Proposal—Summary Statement.

This statement is supported by a schedule of the contractor's own charges to date of termination—B-1 or B-2.

1—Form B-1, Contractor's Own Charges Schedule—If contractor is presenting his charges on an inventory basis.

II—Form B-2, Contractor's Own Charges Schedule—If contractor is presenting his charges on a total cost basis.

b.—The "B" schedule is supported by inventory forms:

Form C-1, Raw Materials, Purchased Parts, and Supplies.

Form C-2, Work in Process.

Form C-3, Jigs, Tools, Dies, Fixtures, etc. 2—Where Contractor's Settlement Proposal, before disposal credits, is under \$10,000—Combination Form Procedure.

a.—The Combination Statement Form to be used if contractor is presenting his proposal on the inventory basis (A-2) or if contractor is presenting his proposal on a total cost basis (A-3).

3—Where settlement proposal is under \$500, the short form A-4 may be used.

Even though a particular settlement proposal, before disposal credits, is under \$10,000 the contractor may use the "C" schedules if he finds them more appropriate, or he may use the entire long form procedure, if he prefers.

The "C" schedules, which are the supporting data for other schedules, are the first to be filled out by the contractor whose work has been terminated by the War Department. There are three "C" schedules: C-1 is an inventory schedule for material on hand applicable to the incomplete portion of the terminated contract, including raw materials, purchased parts, and supplies in the contractors plants owned either by the contractor or by the government. Schedule C-2 is an inventory schedule for government or privately owned work in process. Schedule C-3 covers inventories of jigs, tools, dies, fixtures, etc., owned by the contractor

### Plan for Army Contract Settlement

• • • In the Long Form Procedure, for contract settlements over \$10,000, a suggested plan to be followed to the extent practicable is:

1—Submit "C" schedules as quickly as possible to facilitate disposition of inventory. Cost data should be completed to the extent practicable without unduly delaying submission of forms. Cost information is particularly needed for property disposal purposes in connection with the property listed on the C-1 form.

2—Submit "B" schedules, supported by "C" schedules containing cost data so that the accounting review of these charges may be started.

3—Submit "A" Contractor's Settlement Proposal—Summary Statement, which is the basis for the negotiation of a final settlement.

These forms and schedules may be filed at one time, and in some instances the "C" schedules can be filed first and then the "B" and "A" forms filed together.

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## VARIABLE PRESSURE . . .

Heavy initial pressure, normal pressure during current flow and forging pressure.

## HEAD RETRACTION . . .

Working stroke is  $\frac{1}{2}$ "—retraction of  $2\frac{1}{4}$ " is electrically controlled by foot switch.

## AUTOMATIC WATER SHUT-OFF . . .

Water supply is automatically cut off when head is retracted or control switch off.

## BRAIDED CABLES . . .

Used between transformer and upper electrode — result in less fatigue breaks.

## ELECTRO VALVE . . .

Fast-acting d.c. operated solenoid valve controls air to operating cylinder.

**PREHEAT . . .** Scaly, rusty or coated steels easily welded by virtue of pre-heating feature.

## SELF CONTAINED . . .

Controls and contactor are in hinged cabinet — simplifies installation.

## SAFETY SWITCHES . . .

Provide control over welding circuit, control circuit and foot switch circuit.

## ELECTRONIC TIMER . . .

Patented Sciacky Timer uses no intermediate relay — operates relay direct from tube.

## TRANSFORMERS . . .

Secondaries are hard rolled copper—having less tendency to overheat.

## WIRING . . .

Terminal board wiring — plug and receptacle connections between welder and control cabinet.

TYPE  
PMCO1-12

**SPEED . . .** 180 spots per minute on two thicknesses of .032" pickled mild steel.

**FOOT SWITCH . . .**  $\frac{1}{4}$ " stroke on covered foot switch — operator need not raise entire foot from floor.

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## Try This For Ten Seconds

Just take a couple of pencils right now and try to hold them in perfect alignment without touching each other while you count 10.

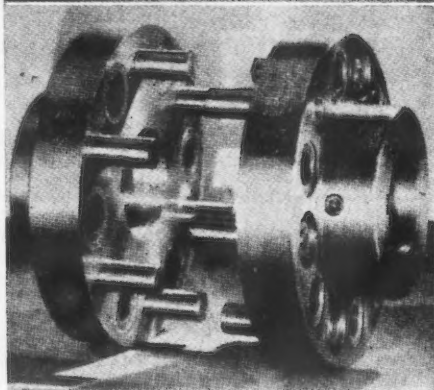
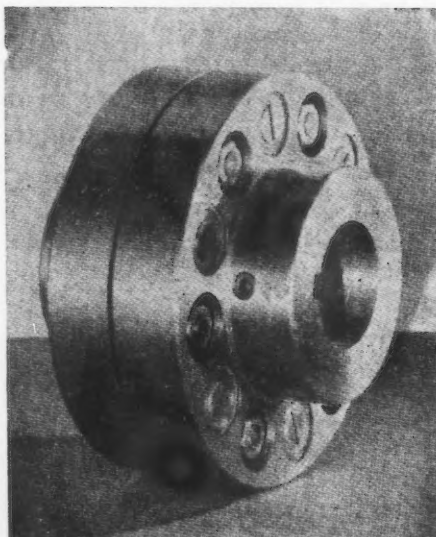
This will quickly show you why a good flexible coupling is essential when connecting driving and driven shafts to prevent excessive bearing wear due to unavoidable misalignment.

Ajax Flexible Couplings have been doing this job for 20 years. They do it without lubrication because of their rubber bushed, graphited - bronze bearings and interlocking drive studs. Write for the facts on Ajax Flexible Couplings.



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Incorporated 1920



**Flexible Coupling Co.**  
**WESTFIELD, N. Y.**

or the government. These inventory schedules will be used for the following purposes:

1—Property disposition copies are to be mailed to the government representative named in the Termination Notice (if a prime contract) or to the contractor from whom was received the "Notice of Termination" (if a subcontract) as soon as the inventory information is entered.

2—Contractor's own charges schedule copy is to accompany any charge schedule (B-1 or B-2). It is not necessary to prepare this copy for government owned property.

3—Contractor's settlement proposal copies, one of which is the original, will accompany the Contractor's Settlement Proposal (form A-1). By this time, such inventory as will be disposed of by a contractor will have been sold, retained, or otherwise disposed of, and the disposal information entered in the C schedules, as provided in the columnar instructions.

4—Contractor file copy should be maintained for records showing the same information as the original.

On the "C" schedules, each item is to be listed separately, numbered and described. The columnar headings are specific in the data required. Cols. 1 and 2 call for the line number and a description of the article.

In schedule C-1, material inventory schedule, cols. 3, 4, and 5 require the quantity of an item on hand, unit of measure, and estimated total weight. Cols. 6 and 7 require the unit and total cost to the contractor. Cols. 8 through 15 cover the disposal means. Col. 8 is headed "Recommended Disposal," and the contractor is asked to recommend a disposal method, using a code. The code is: D—Sell to distributor; M—Sell to manufacturer; P—Public sale on bid; W—Sell to other manufacturers (name same); V—Sell to original vendor; S—Scrap (give reasons); and X—other method (explain).

Col. 9 of C-1 asks for the OPA ceiling or market price per unit, if practicable, and if the ceiling prices are shown, this is indicated by the letter "c" preceding the stated price. Any offer by the contractor to buy such materials at less than cost can be shown in cols. 10 and 11 but must be explained. The quantity and amount desired by the contractor are shown in these columns.

Credits claimed by the contractor are shown in cols. 12 (quantity) and 13 (amount of proceeds or credits) under the heading of "Disposal Credits." Col. 14 is the difference between col. 3 and col. 12, and will show the quantity of each item remaining.

Inventory Schedule C-2 for work in process on the incompleting portion of a terminated contract is similar in nature to schedule C-1. A description and an item number for each unit are



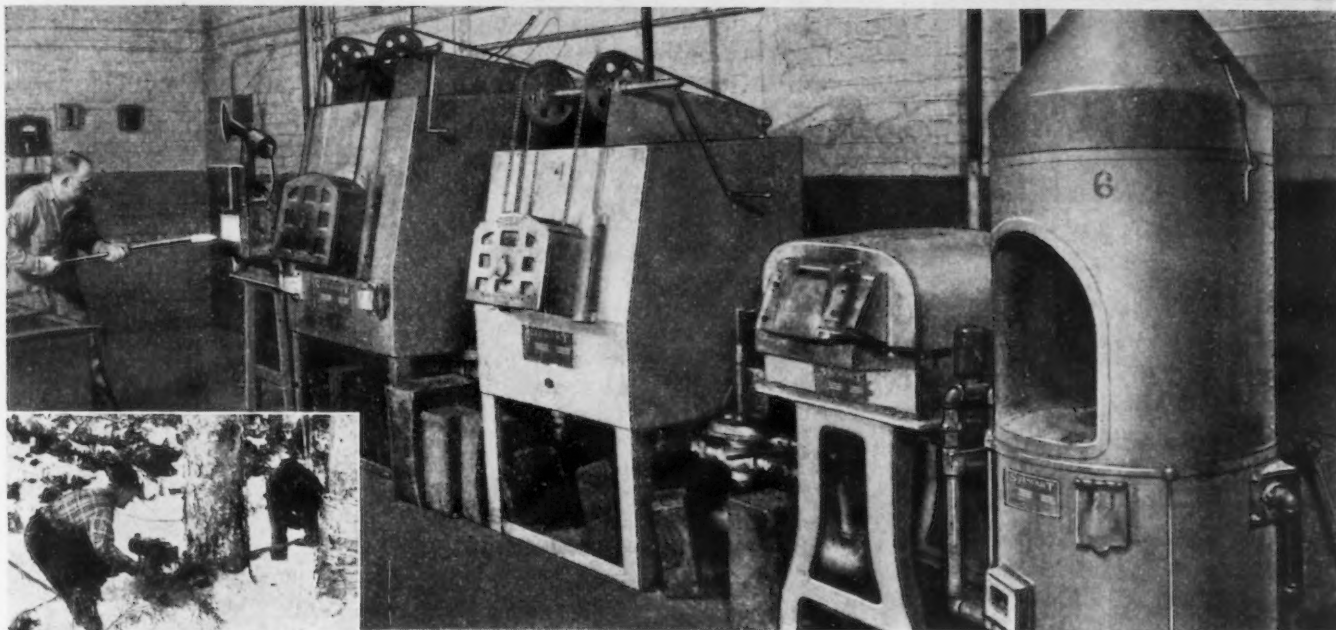
# HEAT TREATING PARTS, TOOLS, DIES, USED IN PORTABLE POWER TOOLS, with



# STEWART

THE BEST INDUSTRIAL FURNACES MADE

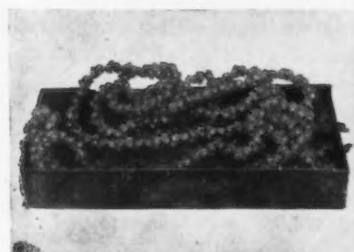
No. 51  
OF A  
SERIES  
of Typical  
Installations



One of the most profitable uses for Mall gasoline engine chain saws is tree felling. Stumps are shorter than when trees are felled by hand and more timber cut per day. Notching and cutting can be done with equal efficiency by using a Mall chain saw.



Chain saw sprockets for the portable saw shown in the illustration above. These sprockets are heat treated in Stewart Oven Furnaces.



Chains of special saw steel—the tool that does the cutting. The keen cutting edges are secured by proper heating and tempering in Stewart Furnaces.

## FLEXIBILITY A FEATURE OF HEAT TREATING DEPARTMENT AT THE MALL TOOL CO., CHICAGO, ILL.

The Mall Tool heat treating line as illustrated above is typical of many Stewart installations in shops where a large quantity of different parts must be heat treated every day. This flexibility has been accomplished by having both a large and small semi-muffle oven for carbon steel heat treating, normalizing, annealing, and pre-heating high speed steels. In addition, a small Stewart oven designed for high speed steel temperatures is included together with a larger Stewart unit equipped for high speed steel work. The latter can also be used for normalizing, forging or forming work, and both for heat treating alloy steels. In this way, the larger units can be reserved for larger batches; the smaller units for smaller quantities of different types of steel. Temperatures in the smaller units can be quickly adjusted to meet varying requirements.

The Stewart Pot Furnace is used for cyaniding and is available for other operations such as lead or salt hardening and tempering, if required.

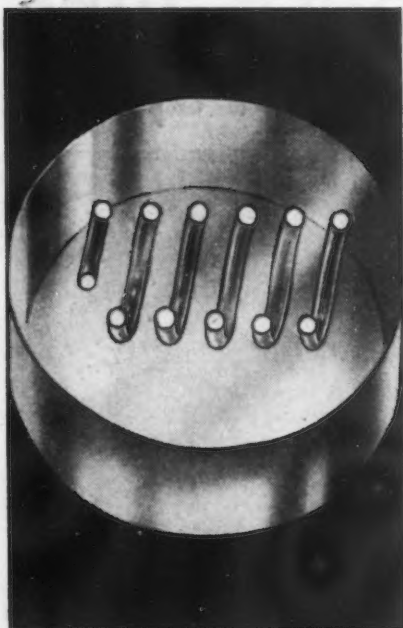
This installation is typical of the industrial furnaces Stewart engineers are building every day, both large types to meet the specified requirements of manufacturers all over the continent, and a complete line of standard types of which those being used at the Mall Tool Company are typical examples.

*A letter, wire or 'phone call will promptly bring you information and details on STEWART Furnaces, either units for which plans are now ready or units especially designed to meet your needs. Or, if you prefer, a STEWART engineer will be glad to call and discuss your heat treating problems with you.*

**STEWART INDUSTRIAL FURNACE DIVISION of CHICAGO FLEXIBLE SHAFT CO.**

Main Office: 5600 W. Roosevelt Road, Chicago 50, Illinois

Canada, Factory: (FLEXIBLE SHAFT CO., LTD.) 321 Weston Rd., So., Toronto 9



## A vise that's transparent!

• Modern warfare has measurably increased the number of special alloys used in spring making. At the same time modern plastics have simplified the requirement of careful, systematic analysis.

Simply by cutting and polishing the transparent lucite which securely grips an embedded spring a cross section of each coil is exposed and readily viewed. The microscope is but one of the tools we employ to produce accurately designed longer lasting springs.

Phone Holly, 2211 or from Detroit, dial Cherry 4419

**AMERICAN  
SPRING OF  
HOLLY, INC.**  
HOLLY, MICHIGAN

listed in cols. 1 and 2. The quantity on hand and total weight are shown in cols. 3 and 4. Cost data are described in cols. 5 through 8, with material in col. 5; direct labor in col. 6; indirect factory expense in col. 7; and total factory cost in col. 8. Col. 9 asks for the contractors recommendations for disposal, using the same code as in form C-1. Col. 10 asks for the OPA ceiling or market price paid for each item. Cols. 11 (quantity) and 12 (amount) take care of any offers by the contractor to buy such material, while disposal credits claimed are covered by cols. 13 (quantity) and 14 (amount of proceeds or credits). The balance on hand after disposal is the difference between col. 3 and col. 13 and is shown in col. 15.

Schedule C-3 covers inventories of jigs, tools, dies, fixtures, etc., in the contractors plants. These are itemized and described in cols. 1 and 2. Quantities and total weights are shown in cols. 3 and 4. Unit cost (col. 5) and total cost (col. 6) make up the total cost data required. Cost applicable to the terminated contract is shown in cols. 7 (amount of cost applicable) and 8 (unamortized cost). The disposal information required in cols. 9 to 15 is identical with that required for the other C schedules.

The information contained in the "C" schedules is summarized to obtain the "Contractors Own Charges Schedule (B-1 or B-2). B-1 is for charges on an inventory basis, while B-2 is for such charges on a total cost basis. Under the inventory method, costs allocated to work completed on the incomplete part of the contract, plus profit, are presented in the proposal and this method is recommended where practicable. Under the cost method, costs applicable to all work done on the contract are summarized, plus profit, if any; and deductions are made for payments made or to be made for completed units. In presenting cost data on standard forms, the contractor should be guided by the "Statement of Principles for Determination of Costs Upon Termination of Government Fixed Price Contracts."

For finished units, contractors will usually be paid at the contract price and such units are not to be reported in the inventory forms. Sub-contractors may not in all cases be permitted to obtain payment through regular billing procedure for finished units on hand at date of termination. If such finished units can properly be included in the settlement proposal under the existing contractual ar-

## COMING EVENTS

May 25—American Iron and Steel Institute, New York.

May 25-26—American Machine Tool Distributors' Association, French Lick, Ind.

June 5-6—Machinery Dealers National Association, New York.

June 5-6—Regional Conference of Eastern Chapters of N.I.A.A., Atlantic City, N. J.

June 5-7—SAE National War Materiel Meeting, Detroit.

June 5-7—American Society of Refrigerating Engineers, Pittsburgh.

June 19-22—American Society of Mechanical Engineers, Pittsburgh.

Oct. 5-7—SAE National aircraft engineering & production meeting, Los Angeles.

Oct. 5-6—AIME Electric furnace steel conference, Pittsburgh.

Oct. 10-11—Gray Iron Founders' Society, Inc., Cincinnati.

Oct. 16-18—AIME Fall meeting, iron and steel division, Cleveland.

Oct. 16-20—American Society for Metals, Cleveland.

Dec. 4-6—SAE National air cargo meeting, Chicago.

rangements, they should be reported as follows:

1—Contractors using combination form procedure—List and describe in inventory schedule provided on form A-2 or A-3.

2—Contractors using long form procedure—Use a separate page of form C-1 with headings modified.

The condition of equipment listed in the schedule C-3 or of property listed in schedules C-1 or C-2 which is other than new and excellent should be indicated, using the following condition codes.

- N—New
- E—Used—Reconditioned
- O—Used—Usable without repairs
- R—Used—Repairs required
- X—Salvage, obsolete property, no value for use as originally intended.
- 1—Excellent
- 2—Good
- 3—Fair
- 4—Poor

Except in case of salvage, a "letter-number" combination must always be used to describe condition. For example, a piece can be labeled N2—new and in good condition.

Forms A-1, A-2, and A-3 are the Contractors Settlement Proposal, and are a summary statement made up from the B schedules. A-1 is for proposals of \$10,000 or over before disposal or other credits. Forms A-2 and A-3 are for proposals under \$10,000 and are for proposals on a Total Cost basis or an Inventory basis.

# Shafer

# Achievement Awards

Bearings have ideas for their extended use or for the improvement of the design, construction, installation or service of these bearings.

That such ideas and uses may be vital to the welfare of the nation must be apparent to any thinking man who envisions the role played by bearings in a nation increasingly on "wheels" . . . not only in transportation but all the machines of industry and domestic activity. It is with the intention that these ideas be not lost to the nation that the Shafer Achievement Awards have been instituted.

Awards as stated above will be made on the basis of the merit in whatever ideas are submitted as valuable contributions to the art of design, manufacture, application or use of Shafer Self-Aligning Bearings. The opinion of the judges will alone determine the relative merits of any ideas submitted and all decisions of the judges will be final. In the event of any ties, identical or duplicate awards will be made. The Shafer Bearing Corporation reserves the right

to adopt or make use of any ideas submitted.

Any and all persons shall be eligible for participation in Shafer Achievement Awards and there are no restrictions as to the number of entries which any person may make. There are no limitations as to the form in which ideas may be submitted, providing only that the ideas or suggestions are set forth in a clear and understandable manner. All entries received at the headquarters offices of Shafer Bearing Corporation, 1422 W. Washington Blvd., Chicago 7, Illinois, on or before September 1, 1944 will be eligible. Awards will be made as soon as possible thereafter and award winners notified by mail and through announcements in magazines of national circulation.

#### *Judges of Shafer Achievement Awards Competition*

**JOHN J. SCHOMMER**, Professor of Industrial Chemistry, Illinois Institute of Technology. Nationally recognized authority on industrial processes and engineering design.

**PHILLIP C. HUNTLEY**, Formerly Head of Mechanical Engineering Department, now Head of Civil Engineering Department, Illinois Institute of Technology. Widely known engineering consultant.

**CHARLES A. NASH**, Associate Professor Electrical Engineering, Illinois Institute of Technology. An authority of broad practical experience in Electrical and Mechanical Engineering.

**ARTHUR H. WILLIAMS**, Vice-President, in charge of Engineering, Shafer Bearing Corporation.



Address all entries to the  
Shafer Achievement Awards Committee

## *Shafer Bearing Corporation*

1422 West Washington Blvd., Chicago 7, Illinois



## Improved Steelmaking Techniques Outlined By Dr. Zimmerman

### Chicago

• • • Wartime research and technical advances in steelmaking have pushed the clock ahead and can be applied to improve peacetime products in the postwar period, R. E. Zimmerman, vice-president, U. S. Steel Corp. said. Speaking before the American Steel Warehouse Association meeting, he outlined a number of war inspired achievements which can be adapted to postwar civilian steel production. These include better quality resulting from improvements in steel-making processes; more efficient equipment; new grades of alloy steels; strides in heat treatment and welding; and new uses of steel in housing.

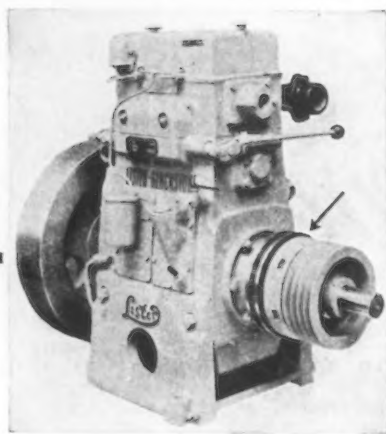


Dr. R. E. Zimmerman

Discussing postwar competition between industries, Dr. Zimmerman told the warehousemen that "steel is by nature well equipped to make a case for itself. Let us dismiss both over confidence and bashfulness, and proceed in the firm belief that the steel warehouses of this country will continue to have customers calling for steel."

The full list of the wartime improvements will not be known until the war ends, Dr. Zimmerman declared. It is not the time to predict too specifically, he said, just what kinds of steel will be handled in the era of peace, for many changes may still take place in the interval before it arrives.

Continued research throughout recent years has contributed much to the development of steel products electrolytically coated with tin, zinc, and other metals, Dr. Zimmerman said. "They will be available for commercial uses after the war. In quite a different category we find some of the highly alloyed steels, further developed for particular needs of the armed services, which will likely be applied to special pur-



## *Stearns* MAGNETIC CLUTCHES and DIESEL ENGINES

Note the arrow! It points to a Stearns Magnetic Clutch in a Diesel-ammonia compressor hookup . . . only one of many applications for magnetic transmission devices. They offer dependable, economical service with near or remote control. There is a size and design, also clutch and brake combination, to suit your requirement . . . extreme flexibility, smooth acceleration, fast stop. Will give you definite savings in operating costs and maintenance expense.



OUR BULLETIN 225, ABOVE, IS FULL OF INTERESTING INFORMATION ON THE SUBJECT. WRITE FOR IT.

Consult us on your transmission problems, in your plant or product. We invite your inquiry. No obligation. We are pioneers in the development of magnetic friction devices of all kinds.



Pulleys—Drums  
Magnets of all kinds  
Separators—Brakes

**MAGNETIC MFG. CO.**

635 S. 28th St.  
Milwaukee 4, Wis.

# BOHN

## In the New Products...

and in the refinements of present products that will come in the post-war era —light weight will be an important feature.



Hence —aluminum and magnesium alloys will have a vital role in these developments.

The Bohn engineering staff and unexcelled research facilities will be at your disposal—in planning these new developments.



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WAR  
BONDS

**BOHN ALUMINUM AND BRASS CORPORATION • DETROIT 26, MICHIGAN**

GENERAL OFFICES — LAFAYETTE BUILDING

*Designers and Fabricators — ALUMINUM • MAGNESIUM • BRASS • AIRCRAFT-TYPE BEARINGS*

# NO leakage



## GUSHER COOLANT PUMPS



Packing nut, foot and relief valves are eliminated — yet, there is no friction or binding, and no leakage. Large ball bearings and sturdy one-piece suspended shaft insure rigidity and longer life. Delivers coolant from a dribble to maximum capacity. There is a model and type for your needs. Write for complete new catalog.

### Model 11020-A

Internal discharge type. Outside piping eliminated. From 1/10 to 3/4 h.p.

## THE RUTHMAN MACHINERY CO.

1821 READING ROAD

CINCINNATI 2, OHIO

The "Gusher"—A Modern Pump for Modern Machine Tools.

## NEWS OF INDUSTRY

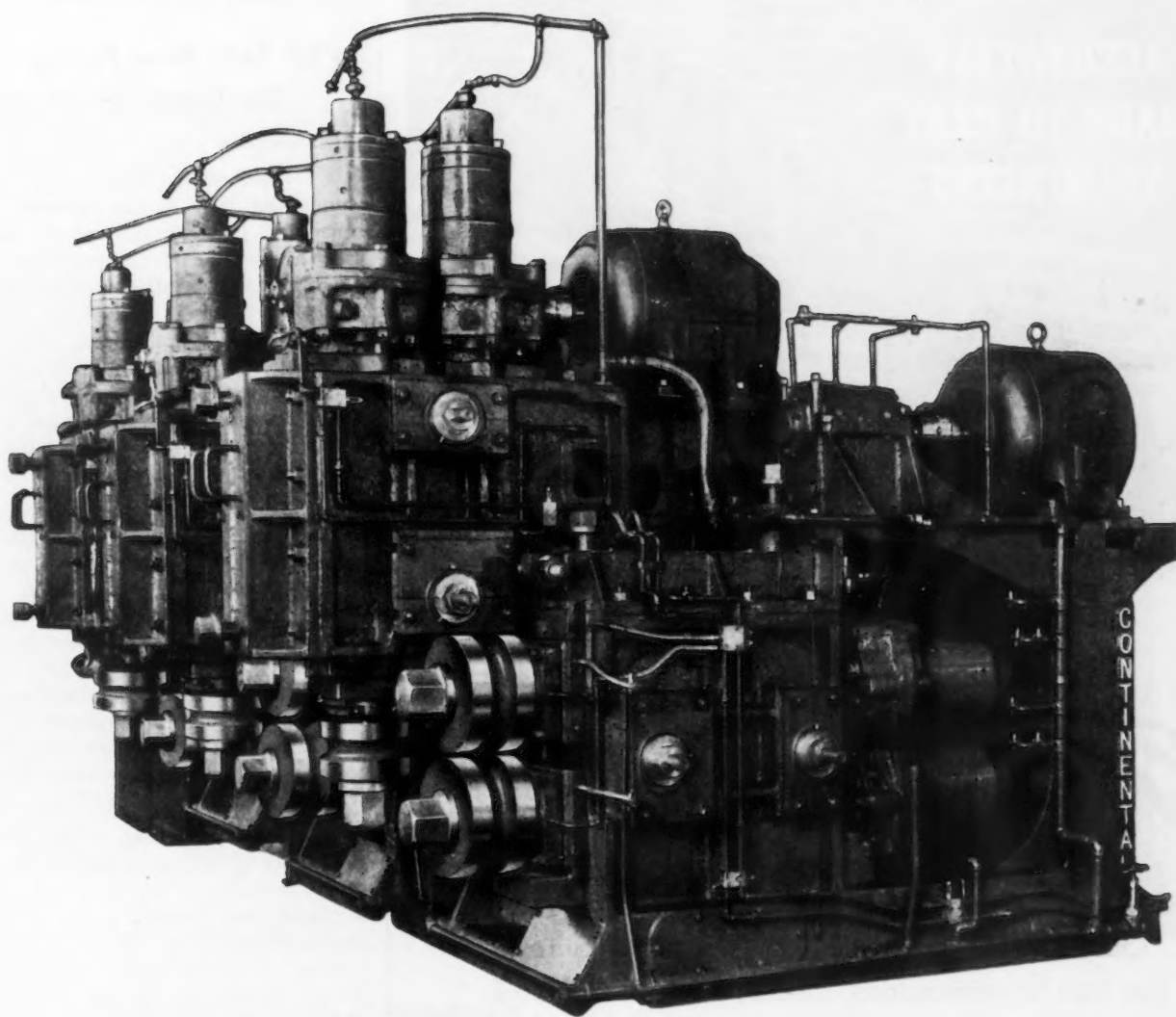
poses in the future. Stainless steel, improved and better than ever, will be ready to shift from the service canteen or mess hall to the home and hotel and restaurant, when the signal is given."

Postwar improvements in home building were visualized in intensified studies of cold formed light weight structural members made to help fill the needs of the armed forces for steel huts, task force buildings and other small structures. "Before long," Dr. Zimmerman said, "the steel industry will be in position to offer the newly acquired data, in convenient form, to designers of relatively small buildings so that they may take full advantage of it in planning their structures. The broad aspect of this line of engineering research is that it will aid in the rational utilization of steel—and thus benefit all parties concerned." The U. S. Steel Corp., recently acquired the Gunnison Housing Corp., New Albany, Ind., a prefabricated housing company. (THE IRON AGE, May 4, 1944, page 118.)

**KEEN TOUCH SENSE:** Warren Black, 79-year old precision instruments maker, can distinguish by sight and touch alone the difference between 0.020, 0.022, and 0.024-in. platinum wire diameters. Employed at Brown Instrument Co., Philadelphia, inspectors claim they have failed to find "Blackie" wrong in 20 years. Here, he is examining a platinum-rhodium thermocouple weld.







**CONTINENTAL**  
**Continuous Weld**  
**TUBE MILL**

*Manufacturers of Carbon and Alloy Steel Castings, Rolls, Rolling Mill Equipment, Complete Mills and Special Heavy Machinery.*

Special design of Continental Continuous Weld Tube Mills permits rolling of tubes with uniform wall thickness.

A sturdier, smoother operating and better controlled mill for producing pipe up to 4" diameter in continuous lengths from coiled strip.

The economical way to produce butt weld pipe in all standard wall thicknesses and in any desired length at 90 to 300 feet per minute.

Individual motors for each pair of rolls, directly connected without the use of spindles—no need for matching diameters of rolls for various stands.

Quick, accessible adjustment for horizontal, vertical and longitudinal movement of each roll.

**CONTINENTAL FOUNDRY & MACHINE COMPANY**

(FORMERLY CONTINENTAL ROLL & STEEL FOUNDRY COMPANY)  
 CHICAGO • PITTSBURGH

**ACCURATELY  
MADE TO MEET  
YOUR NEEDS**

## **OLIVER** *CAP SCREWS*

Made to close tolerances, closely checked by "Quality Control" inspections, Oliver Cap Screws are true to dimensions, cleanly threaded and of uniform strength. Because we know that cap screws generally have particularly exacting jobs to perform, we take especial pride in making them to fully meet your toughest assignments.

The experience gained in the design and manufacture of other Oliver products—bolts, nuts, rivets, upset items—is utilized in making cap

screws that give complete satisfaction always. We will be glad to discuss your cap screw requirements with you.



**For uniformly high quality  
cap screws, specify Oliver!**

**OLIVER**  
IRON AND STEEL  
*Corporation*  
**PITTSBURGH, PENNSYLVANIA**  
**BOLTS . . . NUTS . . . RIVETS**  
**STEEL FASTENERS**

### **WLB Sets New Policy On Company Bonuses**

*Washington*

• • • The National War Labor Board announced that it has adopted the following policy in regard to voluntary applications for approval of annual bonuses or other similar types of bonuses:

Voluntary annual-bonus cases or other similar types of periodic-bonus cases which require board approval (that is, are not exempt under General Order 10) shall be decided on the basis of the following criteria:

1—There shall be no appreciable increase in cost resulting from the introduction of such a bonus plan or resulting from an increase in the amounts or percentages of bonuses paid under an existing plan during the preceding bonus year. Nor shall the introduction or modification of such a bonus plan be approved if approval would furnish the basis either to increase prices or to resist otherwise justifiable reductions in prices.

2—An establishment shall not be permitted to introduce such a bonus plan unless the payment of such bonus and the amounts or percentages thereof conform to the practice prevailing in the industry in the area before October, 1942, and does not create inter-establishment or intra-establishment inequities.

3—Such a bonus plan shall not be approved on the basis of general allegations of increased work or duties performed by the employees subject to the plan. (This rule shall not preclude rate or bonus adjustments permissible under General Order No. 6 for specific individuals whose duties have changed so substantially that in effect new jobs have been created.)

Exempt from WLB approval under General Order 10 are a bonus, fee, gift, commission or other form of compensation customarily paid to an employee in the past if it meets one of these two standards:

1—If in a fixed amount, the total amount does not exceed that paid for like work during the preceding "bonus year."

2—If computed on a percentage, incentive or other similar basis, the rate and method of compensation are not changed.

A bonus payment made to an employee entering the armed forces of the United States does not require the approval of the War Labor Board.

# 1

# SOAK

*when every minute counts*

## IN KELITE PROCESS K... READY FOR FINISHING

Metal finishing in many plants has been greatly simplified by process K.

This remarkable new development of Kelite pH Control thoroughly removes heat treat scale and leaves the surface with just enough of a tooth to insure reliable paint adhesion or plating.

Kelite Process K is easy to handle. No critical time element is involved in its use. And it has the very valuable additional advantage of inhibiting the action of rust.

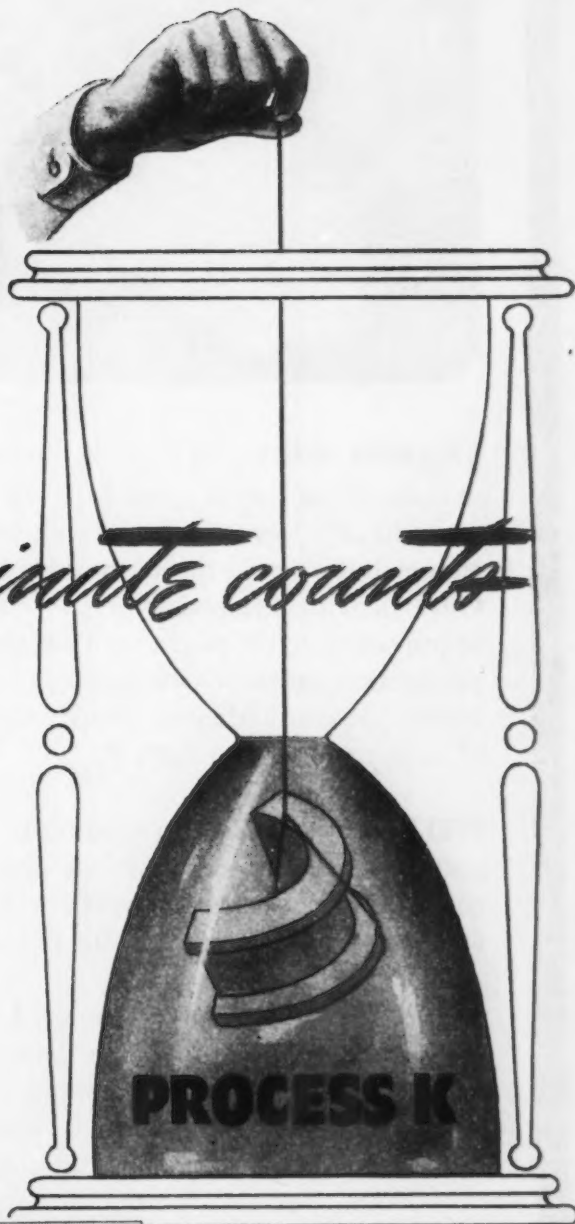
ASK US FOR THE FULL STORY ON KELITE PROCESS K



909 East 60th St., Los Angeles 1, Calif.

Manufacturing Plants in Los Angeles, Chicago, Perth Amboy, Houston

BRANCHES IN PRINCIPAL CITIES

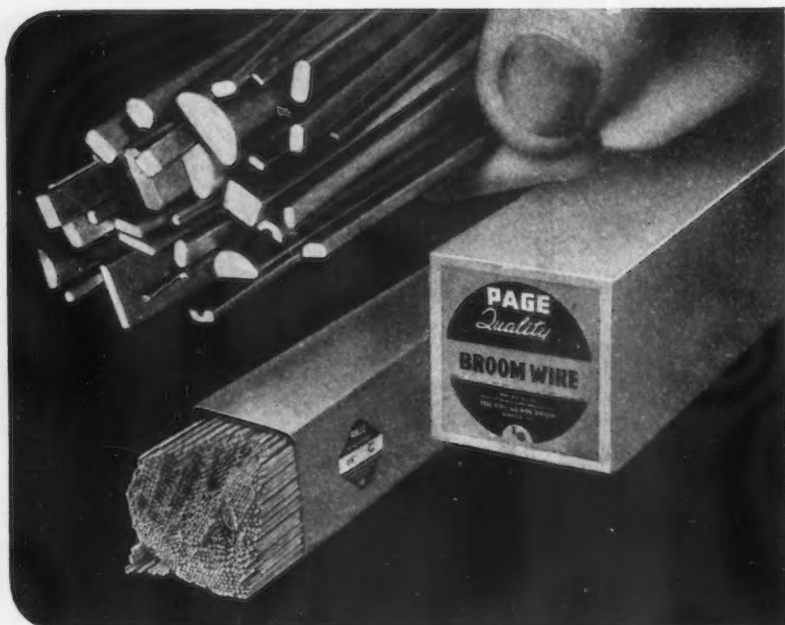


INDUSTRIAL CHEMICAL  
PROCESSES & MATERIALS

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Kelite Products, Inc.



# PAGE *for* WIRE



**SHAPED WIRE**—In Carbon Steels, Armco Iron and Stainless Steels—widths to  $\frac{3}{8}$ ". End section areas to .250" square. A wide variety of standard shapes but keep in mind the idea that by having **PAGE** provide Shaped wire to your own specific requirements you might well be able to cut your production costs. **PAGE** will welcome the opportunity to plan with you against the day when all of us get the "green light."

**WELDING WIRE**—For welding Iron, Alloy Steels and all analyses of Stainless Steel. Bare and coated. For overhead, vertical and horizontal welding—see your local **PAGE** Distributor.

**GENERAL WIRE** — Untempered and oil-tempered spring wire, rope wire, aircraft wire, lock-washer wire, bond wire, telephone wire, armature bending wire, thermo couple wire and special wires for a large range of manufacturing needs.

## PAGE STEEL AND WIRE DIVISION

Monessen, Pa., Atlanta, Chicago, Denver, Los Angeles, New York, Pittsburgh, Portland, San Francisco



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**AMERICAN CHAIN & CABLE COMPANY, Inc.**  
BRIDGEPORT • CONNECTICUT

## NEWS OF INDUSTRY

### Veteran Re-employment Program Started By Westinghouse Plant

• • • A comprehensive program for the re-employment of discharged servicemen and aid in the readjustments from military to civilian life has been announced by the East Pittsburgh plant of the Westinghouse Electric & Mfg. Co. Calling for the re-employment of all Westinghouse veterans and, whenever possible, for the hiring of veterans who worked for other firms before entering the service, the new program is headed by Walter L. Hitt, Plant Protection Chief.



Walter L. Hitt

More than 5600 employes of the East Pittsburgh Plant have been given military leaves of absence. To date only 445 have returned to work.

Key point in the program is a thorough analysis of every job in the big plant to determine those that can be filled with handicapped veterans. By checking a "job card" listing the qualifications for a certain task it is quickly determined whether the applicant is fitted for the work. Most men

*Other plans for the rehabilitation and reemployment of veterans have been described in THE IRON AGE. These appeared in the issues of: Jan. 13, page 78; Feb. 24, page 105; March 23, page 100; March 9, page 108; and April 6, page 104.*

were given medical discharges for defects which made them unfit for hard military life but which, in most cases, did not affect their usefulness in industry.

The rehabilitation program, which is operated in cooperation with the United States Employment Service and the Veterans Employment Service, also provides for: 1—Continuous service credit for time spent in the armed forces by employed veterans. 2—Constructive aid in rehabilitation of veterans in line with service medical recommendations. 3—Helping veterans with "red tape" work in connection with federal benefits and in the handling of civilian problems such

# WE CAN CAST YOUR INGOT

Sizes up to 42" Diameter

The melting facilities of the Barium Steel Shops are now available for your work — as are the other skilled Barium Unified Control services of forging, heat-treating and machining.

## Melting Facilities

consist of several open hearth furnaces up to 35 tons in size . . . now melting and meeting all analyses of carbon and a range of alloy steels to the critical tests of Aircraft and United States Government specifications. We are able to cast ingots up to 42" diameter and 40,000 pounds — and also to carry through all subsequent operations of forging, heat-treating and machining.

Other facilities include: 1500-ton and 1000-ton FORGING PRESSES for your heavy requirements and STEAM FORGING HAMMERS of up to 12,000-pound capacities for flat die work . . . HEAT-TREATING AND ANNEALING FURNACES of the best modern type . . . MACHINING FACILITIES and a well-equipped CHEMICAL AND METALLURGICAL LABORATORY.

You may have Barium Unified Control on all these services — or put us to work on one or more. Tell us what you need.

POURING at

B

**ARIUM**  
STEEL CORPORATION

*Producers of Carbon,  
Alloy and Stainless Steels*

**CANTON · OHIO**

**Tough production problem overcome in**

## **REMOVING INSOLUBLE SMUT**

**from Steel and Iron Parts!**

*Insoluble smut is usually one of the most difficult deposits to remove from ferrous surfaces before electroplating. But it is now no longer a problem to plants using Oakite anodic degreasing. The reason? They are using that time-saving, long-lasting anodic degreasing material:*

# **OAKITE COMPOSITION No. 90**

Combining high conductivity, wetting-out, penetrating and emulsifying properties, Oakite Composition No. 90 provides the fast-working, THOROUGH smut-removing action which is of primary importance in securing the chemically-clean surfaces so essential in subsequent finishing operations. Moreover, Oakite Composition No. 90 has unusually long solution life . . . directly contributes to lower unit cleaning costs.

### **FREE Booklet Gives Complete Details!**

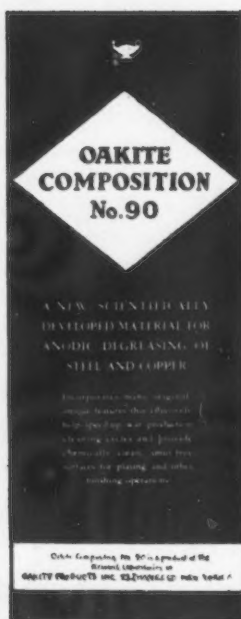
Based on the successful wartime experience of plants the Nation over, a new 16-page Oakite instruction manual describes in detail the eight major advantages of Oakite Composition No. 90 . . . tells how typical plants are increasing output, securing better finishes through the use of this material.

**OAKITE PRODUCTS, INC., 30H Thames Street, NEW YORK 6, N. Y.**  
Technical Service Representatives in All Principal Cities of the United States and Canada

**OAKITE**  
MATERIALS . METHODS . SERVICE



**CLEANING**  
FOR EVERY CLEANING REQUIREMENT



as housing and rationing. 4—A follow-up system for employed veterans to help them readjust their lives to civilian employment.

Important in successful operation of the plan is the work of the Medical Department. For example, an examining physician checks a returning employe who was a lathe operator. The doctor compares his findings with the "job card" and if the applicant is no longer physically able to handle the job he is assigned other work.

As other handicapped men return from the war, some will be assigned to the plant's training school to acquire new skills. Loss of a hand, for instance, would bar a man from resuming his old job of crane operator. He could, however, learn to operate a machine which requires only adjustments which could be made with one hand.

### **Among the Week's Trade Notes**

Follansbee Steel Corp., Pittsburgh, has appointed Stanley G. Disque, 420 Board of Trade Building, Indianapolis, as sales agent, it has been announced.

Autogenous Gas Co., Cleveland, has changed its name to American Utilities Corp.

B. F. McDonald Co., Los Angeles, has moved to larger quarters on South Hoover Street. The firm's manufacturing, assembling, and executive departments are consolidated in the one building.

Metal Lath Manufacturers Association, Cleveland, announces that it has re-established its technical division.

Allen-Bradley Co., Milwaukee, announces the removal of its Cleveland offices to 4506 Prospect Road, Cleveland 3. R. J. Roy remains in charge as Cleveland district manager.

Cutler-Hammer, Inc., Milwaukee, has moved its Portland, Ore., sales office to new quarters in the Security Building, 131 S. W. Fourth Avenue. Frank J. Woldrich, sales engineer, is in charge.

Size Control Co., Chicago, has appointed Ward Sales Co., 1472 Broadway, New York, as agent in the New York area. Precision thread and gear measuring wires, which have recently been added to the company's gage line, will be handled as well as reversible plug gages.

Elliott Co., Jeannette, Pa., has acquired the plant and facilities of the Roto Co., Newark, N. J.

Great Falls Paper Co., Great Falls, Mont., has been appointed distributor in Montana for the Crosley Corp., it has been announced.

Vickers, Inc., Detroit, announces the establishment at Beverly Hills, Cal., of a West Coast test and service center. The added facilities supplement the sales engineering organization that has been established in the Los Angeles area for several years.





*When you need*  
**EVERLASTING  
 FASTENINGS**

## ALL ROADS LEAD TO HARPER

**B R A S S**

**B R O N Z E**

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**E V E R D U R**

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**S T A I N L E S S**

When you need fastenings that  
 (1) resist rust and corrosion . . . (2)  
 are non-magnetic . . . (3) are practi-  
 cally non-sparking . . . (4) are usable  
 again and again . . . your road leads  
 to Harper's.

The Harper organization is known  
 as "Headquarters for Non-Ferrous and  
 Stainless Fastenings" because it spec-

ializes on these products . . . makes  
 nothing of common steel. Harper stocks  
 4280 different items . . . operates hun-  
 dreds of modern machines especially  
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 ings . . . maintains a large staff of  
 field service engineers. New, colorful  
 1944 catalog and reference book will  
 be ready soon.

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 BRANCH OFFICES: New York City • Philadelphia • Los Angeles • Milwaukee • Cincinnati • Houston  
*Representatives in Principal Cities*

# HARPER

EVERLASTING FASTENINGS





Users report from 25% to 100% more production per wheel when LIONITE abrasive grains are used on polishing wheels. NB LIONITE is the ideal grain to use with cements. CBT LIONITE, the grain with the *ETCHED* surface, is still the standard for use with glue. Both types of grains are polyhedral in shape and are free from unproductive flats and slivers.

You are in good company when you use LIONITE Grains, for leaders in all branches of industry use these superior polishing grains. The uniformity of LIONITE from lot to lot means more uniform quality for your product and lower polishing costs.

LIONITE abrasive grains are no longer under allocation. All sizes are now available for prompt shipment from stock. Make your next order LIONITE.



## GENERAL ABRASIVE COMPANY, INC.

Lionite and Carbonite Abrasive Grains  
NIAGARA FALLS, NEW YORK, U. S. A.

## War Order Volume Of International Harvester Slackens

### Chicago

• • • Volume of war production is falling, both in dollars and in proportion to the total business of International Harvester Co., Fowler McCormick, president, revealed at the annual stockholders meeting at Hoboken, N. J., last week (May 11).

In the first six months of the 1943 fiscal year, war products comprised 57 per cent of sales for the period totaling \$150,168,000; in the last six months of 1943, the fiscal year, 71.1 per cent of total sales of \$297,867,000; and in the first six months of 1944, fiscal year, 58.2 per cent of total sales of \$266,766,000.

"The slacking off in war production is caused by the reduced requirements of the armed services and is manifested in three ways—first by completion of war contracts which are not renewed; second by cutbacks in the rate of production on continuing contracts; third by outright cancellation of some contracts," McCormick said.

Production of farm tractors, implements and parts during the first six months of the current fiscal year was more than double their production for the same period last year, and is still increasing, he declared. During the production period ending June 30, Harvester will build its full quotas of all but three of the more than 60 classifications of farm equipment it is authorized to build under order L-257, it was predicted, and the future outlook was described as bright.

McCormick anticipated an expansion of civilian truck production, stating that the company's was 14,000 civilian trucks for the first six months of 1945, in addition to substantial military truck orders, indicating a full truck program for that year.

The company's manpower troubles were traced to a large extent to the period of extreme limitation of farm equipment output, when employees were laid off, resulting in necessity of a recruiting program when production again was expanded. During a ten week period ending March 18 cited by McCormick, Harvester hired 10,644 employees in order to secure an increase in total employment of 1510. About 20 per cent of the company's 72,135 employees are women and 7008 negroes.



# Answers to Everyday Questions about PREformed WIRE ROPE

- 1 Is PREformed a lay of rope?
- 2 Is PREformed a special construction?
- 3 Just what does PREformed mean?
- 4 How shall I mark my orders to get PREformed?

These are questions wire rope users are asking. Here are answers to everyday questions we receive.

First, let us be reminded that there are two kinds of rope. One is non-preformed wire rope, the kind that has served users for many years. Then there is PREformed, the kind which is newer, better, and longer lasting. Because it is a newer type rope, because it does a much better job for users, there are many questions asked about it. Let's consider a few.

## FIRST . . . "Is PREformed a lay of rope?"

No, PREformed does not refer to a lay of rope. Lay refers to the twist or helical form which is characteristic of *all* wire rope. A rope may be Lang Lay, Right Lay, Left Lay, Reverse Lay . . . and each of these lays may be made either PREformed or non-preformed.

Lang Lay ropes should always be PREformed to counteract the tendency towards twisting, because wires and strands are both laid in the same direction in Lang Lay ropes. Further information on Rope Lay is given in the new Macwhyte Wire Rope Catalog, G-15.

## SECOND . . . "Is PREformed a special construction?"

No, PREformed is not a special construction. Construction refers to the number and arrangement of wires in the rope . . . such as 6 x 17 (six strands of 17 wires each), 8 x 19 (eight strands of nineteen wires each), and so on. These constructions can refer to either PREformed or non-preformed wire rope. (For complete data on constructions, see Catalog G-15.)

## THIRD . . . "Just what is PREformed?"

Macwhyte PREformed wire rope is the proper size, grade and construction

you need, *PLUS*. This *plus* refers to the PREforming, a process which forms the wires and strands into a spiral, so that wires and strands lie naturally in place with a minimum of internal stress.



Illustration above tells the story. Notice how the wire has a special shape? It has been PREformed. When the rope is closed (put together in the closing machine), both wires and strands naturally fall into position in the rope.



Illustration above points to the end of a PREformed rope showing how wires lie naturally in place even though no seizing is there to hold them.

The result is a wire rope that is more flexible and that more quickly adapts itself to the equipment on which it is used. Thus, literally, PREforming means better PER-forming on the job.

A PREformed rope is safer to handle, too, because broken wires (which will happen after *long* usage) do not wicker out as in non-preformed wire rope.

## FOURTH . . . "How should I mark my orders to get PREformed?"

Just add the words "Macwhyte PREformed" to your specifications. Like this, for example:

1,250 feet 1" 6 x 19 Lang Lay with IWRC, Macwhyte PREformed Monarch Whyte Strand wire rope.

If you leave out "Macwhyte PREformed," the specification then becomes a non-preformed wire rope specification. The reason? When PREformed is not mentioned on the order, it is a standard practice to supply non-preformed.

## FIFTH . . . Internal Lubrication, too!

And a bonus *Plus* feature of Macwhyte PREformed wire ropes is *internal lubrication*. Not only are wires and strands PREformed, but each wire in the strands is coated with an elastic, non-drying film of lubricant, as explained on pages 10 and 11 of G-15 catalog.

We have been making wire rope for equipment like yours for many, many years. The benefit of that experience is yours for the asking. You can be assured, too, that when you select Macwhyte you are not only getting "the correct rope for your equipment," but also a personal interest in helping you get the *most* out of your rope.

**MACWHYTE**  
**PREformed**  
**WIRE ROPE**

*Plus*  
**Internal**  
**Lubrication**  
**Selected**  
**Steels**  
**Tested-Proved**

The correct rope for your equipment

NO. 741

# MACWHYTE COMPANY

Wire Rope

Manufacturers



2911 FOURTEENTH AVENUE

KENOSHA, WISCONSIN

Mill Depots: New York • Pittsburgh • Chicago • Fort Worth • Portland • Seattle • San Francisco. Distributors throughout the U.S.A.

MACWHYTE PREformed and MONARCH WHYTE STRAND Wire Rope

MACWHYTE Braided Wire Rope Slings

Internally Lubricated Wire Rope MACWHYTE Special Traction Elevator Rope

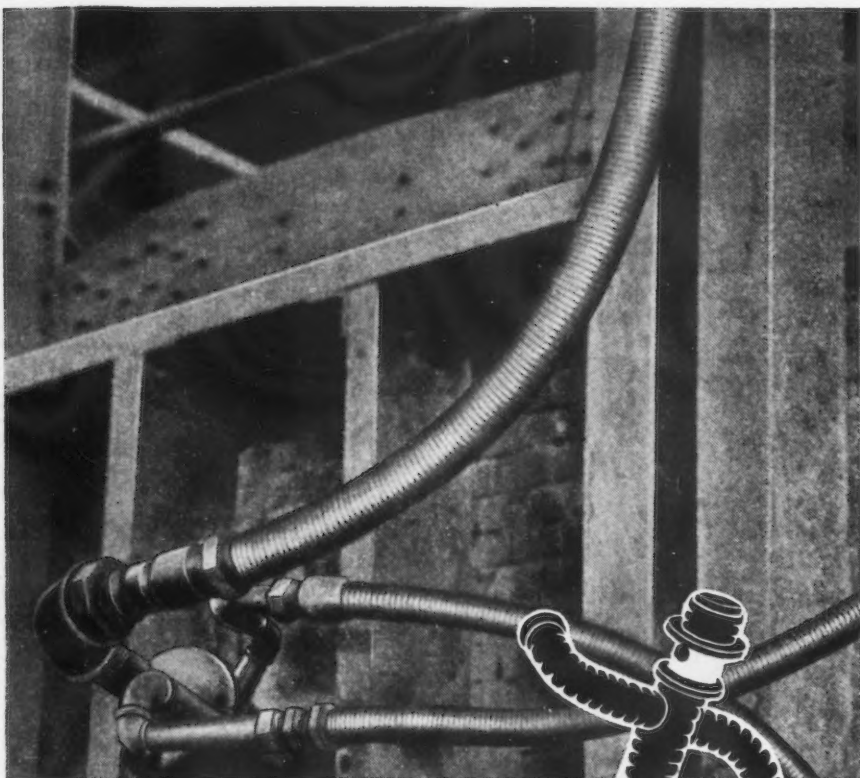
MACWHYTE Aircraft Cables and Tie-Rods

MACWHYTE Stainless Steel Wire Rope

MACWHYTE Monel Metal Wire Rope

THE IRON AGE, May 25, 1944—115





Here's how  
**REX-TUBE...**

**licks maintenance problems**

Chicago Metal Hose Corporation's "Rex-Tube" is used on many types of original equipment. In addition, this standard flexible metal hose is used for maintenance requirements throughout industry in general, frequently replacing more cumbersome and troublesome piping hook-ups.

The application *always* determines the type of flexible metal hose that should be used. Chicago Metal Hose Corpo-

ration manufactures the most diversified line of flexible metal hose products. Therefore, C.M.H. engineering recommendations are complete and unbiased.

The complete line of Chicago Metal Hose Corporation fittings makes installations easier and faster. If you are concerned with the replacement of flexible metal hose, write for complete information.

Flexible Metal Hose for Every Industrial Use

**CHICAGO METAL HOSE CORPORATION**  
**MAYWOOD, ILLINOIS**

Plants: Maywood and Elgin, Ill.

## Dr. Dow Urges Abrupt End to Government Control

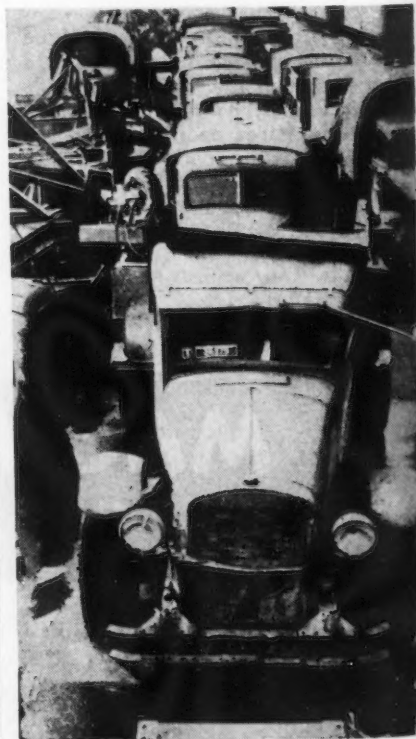
New York

• • • Warning that trying to ease out of governmental controls instead of abruptly terminating them after the war would only ease us into permanent controls that would enslave the nation, Dr. Willard H. Dow in accepting the Gold Medal of the American Institute of Chemists struck out for the United States to start being American again and to start at once.

Dr. Dow, president of Dow Chemical Co., recently appeared before the Truman Committee in Washington and demanded to be heard on what he called "a Department of Justice smear" that his company had been a member of a German cartel. The Committee fully vindicated him.

Much of our postwar planning, said Dr. Dow, is forgetting the individual and tending toward the absolute state. "Take the slogan 'free enterprise.' Everyone seems to have gone overboard for free enterprise. But it appears that the securing of free enterprise is a very complicated matter, and I should hate to be given the task

**BATTLE SALVAGE:** Machines as well as men come back from service for reconditioning. These vehicles on a pier at Seattle were returned from rugged service in building the Alaska Highway. The equipment will go to the Mount Ranier Ordnance Depot, Tacoma, Wash., for rebuilding.



The Ho  
comple  
chips a  
lined—  
malleab  
cast iron  
constru  
tical m



*"Was my face red!"*



The Howell Protected Type Motor, shown, gives complete protection against dripping liquids, metal chips and other falling particles. Completely streamlined — utilizing non-breakable steel frame — malleable or steel base — cast iron end plates and cast iron, weatherproof terminal box are standard construction features. Special horizontal and vertical mountings are available.

Available in sizes 5 H.P. and smaller.

**HORSE:** Mr. Manufacturer, I'm representing Horsepower by Howell. I want to save you trouble, save you time and save you money.

**MANUFACTURER:** That's a big order. You better be sure of your ground.

**HORSE:** Exacting, eh? That's the kind of customers we like to sell. You see we build a complete line of standardized motors and we also build special motors for special jobs.

**MANUFACTURER:** Yes, yes, go on.

**HORSE:** You know it's much more efficient and economical to get a motor with exactly the electrical and mechanical characteristics required to perform your specific job —

**MANUFACTURER:** Yes, I know. I am a Howell user — and a Howell booster, too . . . You built my motors more than 10 years ago.

**HORSE:** Put 'er there, brother, we agree! But don't wait so long to tell me the next time that we see eye to eye on electric motors. The suspense makes my face red. Still, it's gratifying to know that so many shrewd buyers specify Horsepower by Howell and like it.

**HOWELL ELECTRIC MOTORS COMPANY**  
HOWELL, MICHIGAN

Manufacturers of Quality Motors Since 1915



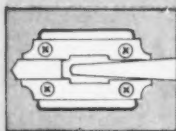
# HOLTITE PHILLIPS SCREWS & BOLTS

*meet every styling requirement  
in your Post-War products plans*

FASTENINGS FOR  
EVERY PURPOSE



## IMPROVED STYLE AND APPEARANCE



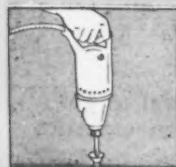
The neat design of HOLTITE-Phillips recessed heads makes them an attractive supplement to decorative hardware or exterior finish.

## NO BURRS TO TEAR OR SCRATCH



Driven easily, HOLTITE-Phillips heads do not burr, thus saving filing operations where burrs would tear clothing or injure hands.

## CUT DRIVING TIME IN HALF



As bit cannot slip from the HOLTITE-Phillips recessed head, spiral and power drivers can be safely used even on finished parts.

Though scientifically designed to cut fastening time 50% and more, HOLTITE-Phillips recessed head presents a design that meets every decorative requirement.

Neat in appearance with heads in any position, a quarter turn will line them up for added attractiveness and symmetry. Furnished in any metal with plated or painted finish to match any material.

Wartime conservation makes it impossible to send catalogs unless requested on your company letterhead

# CONTINENTAL SCREW CO.

New Bedford, Mass., U.S.A.  
BUY MORE BONDS

## NEWS OF INDUSTRY

of reducing some of the prescriptions I read to an algebraic formula. Free enterprise, if it is to be anything but a name, is not a permitted way of business. It arises out of an absence of a permitted way of business."

Turning to talk about having a centralized body to control research, Dr. Dow declared that any curbing of the individual in pursuit of scientific truth would bar all progress. And turning to planning and the responsibility of industry, he said:

"There is much loose talk these days about after the war planning. In typical propaganda style, industry is held up as having the sole responsibility for taking care of all employment after the war is over. I, for one, do not believe this is possible and think it is just another scheme to dodge responsibility. For industry is always a servant and never a master. The responsibility is yours and mine. We must all make our contribution and resolve that there shall not be unemployment after the war. But we shall need to define what we mean by 'employment' and by 'unemployment.' Everyone can be employed. But everyone cannot be employed at exactly the kind of job under exactly the conditions of wages and hours that he or she may want. And 'full employment' comes perilously near to 'directed' employment. There is no 'right to work' but there is a responsibility to work. We need to do some hard thinking about rights and responsibilities, for there cannot be a right without a responsibility nor a responsibility without a right."

## Canada to Help Rebuild War Destroyed Dneiper Dam

Ottawa

• • • It is reported here that Canada may participate in providing equipment for the Dneiper Dam which was destroyed to keep it from falling into the hands of the Germans in 1941. In this connection it is stated that Russia may purchase upwards of \$25,000,000 of hydro-electric generating equipment from Canadian manufacturers, and negotiations now are under way through the commercial department of the Soviet Embassy here. If the deal is consummated, the sale would be financed under the export aid plan.

One important aspect of the transaction would be the beginning of a large volume of peacetime trade between Canada and the Soviet.





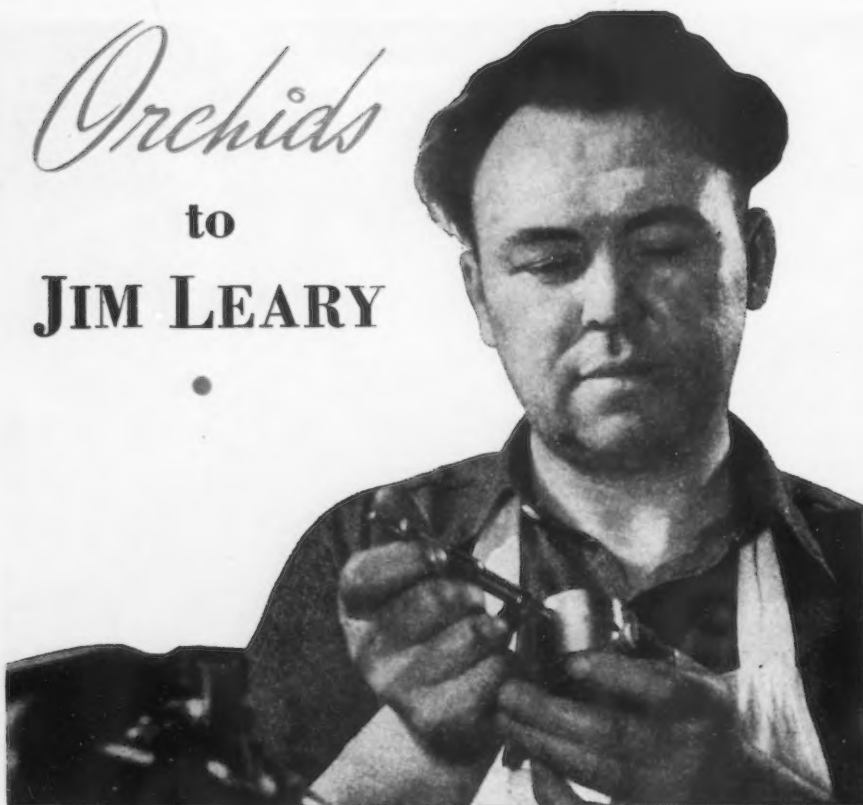
## MASS-PRODUCTION WELDING

● Time-saving, money-saving mass-production methods are employed throughout our manufacture of welded steel tube, tubular parts and assemblies for the transportation industry. Notable are *double* fixtures for the final welding of bomber motor mounts. Your jobs benefit by these advanced methods.

# AMERICAN METAL PRODUCTS COMPANY

5959 LINDALE AVENUE, DETROIT 4, MICHIGAN

# Orchids to JIM LEARY



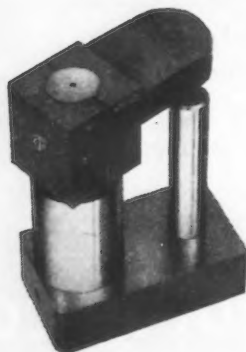
*We* at Turner are justly proud of Jim Leary. First, because he has had a perfect attendance record since he started to work for us on September 20th, 1941. Second, because his skill in grinding has made it possible for us to produce precision gauges that help to speed up production on war material.

Yes, there are other "Jim Learys" in our plant who take pride in their work, that's why we have been able to maintain the highest standards in the manufacture of gauges, even during these days of labor shortages.

Look for this stamp of precision.  
It is your guarantee of a Turner  
Precision Made Gauge.



**TURNER GAUGE GRINDING COMPANY**  
2422 HILTON ROAD PERDUE, MICHIGAN



The Turner Special gauge  
to check the base of  
cartridge cases.

Turner manufactures many  
types of special gauges  
to your specifications.

## NEWS OF INDUSTRY

### Employment Stability After War Requires Immediate Action

#### French Lick Springs, Ind.

• • • Labor found a new leader for the cause of postwar employment security in one of the nation's leading industrialists. Col. Willard F. Rockwell, head of a group of companies that have produced a half-billion dollars' worth of war goods since Pearl Harbor, and currently a vice-chairman of the Manpower Utilization Committee of the War Manpower Commission is the new leader.



Col. W. F. Rockwell

Col. Rockwell, speaking before the American Gas Association meeting at French Lick Springs, Ind., declared that some immediate provision must be made to insure stable employment after cessation of hostilities, for both presently employed labor, and in addition, all returning military personnel.

"Contract termination must not be handled with an exclusive eye to industry," declared Rockwell emphatically. "Labor has as much right and interest in what happens after the peace as management. Any return to civilian production not based upon consideration of continuing employment for our entire people cannot long endure.

"It is obvious that industry, through management, must supply the practical solutions for a problem that is of far greater importance than the paper forms for checks, rechecks, counter checks, and the allocation of petty bureaucratic authority which always hobble any practical results in the government's labyrinthine operations.

"The Timken-Detroit Axle Co. and the Standard Steel Spring Co. are both interested in a practical form of assurance to be given our present and returning workers, one that will enable them to work and produce without the overhanging fear of an eventual return to the dole.

Rockwell, tracing the causes of the depression during the past decade, blamed government fumbling for the



# ALMOST RIGHT IS WRONG

## SMITHway Electrodes in Action

*All-welded Diesel  
engine bases pro-  
duced in quantity  
by A. O. Smith  
for our powerful  
two-ocean Navy.*

**W**HEN you are up against the "buzz saw" of important service, you want electrodes that have been proved practical by shop experience—backed up, of course, by sound research and engineering.

SMITHway Certified Welding Electrodes are reliable *production tools*, thoroughly proved by day-to-day application in our own shops. With us "Almost right is *wrong*." We must have dependable *quality*, dependable *uniformity*, and the right *operating charac-*

*teristics* in the electrodes we use. "Almost right" is not good enough. That's why we make the welding electrodes used in our own plants.

Since there isn't any kind of arc welding we don't do, and since there are many kinds of arc welding done only in our shops, SMITHway Certified Welding Electrodes are *proved* in every type of arc welding operation. That, we believe, assures *better welding results* in your shop. We know it does in ours.

## Mild Steel . . . High Tensile . . . and Stainless Steel WELDING ELECTRODES

*made by welders . . . for welders*

SMITHway A. C. Welding Machine saves  
power; eliminates arc blow.

SMITHway Welding Monitor trains  
better welders faster.



# A.O. SMITH Corporation

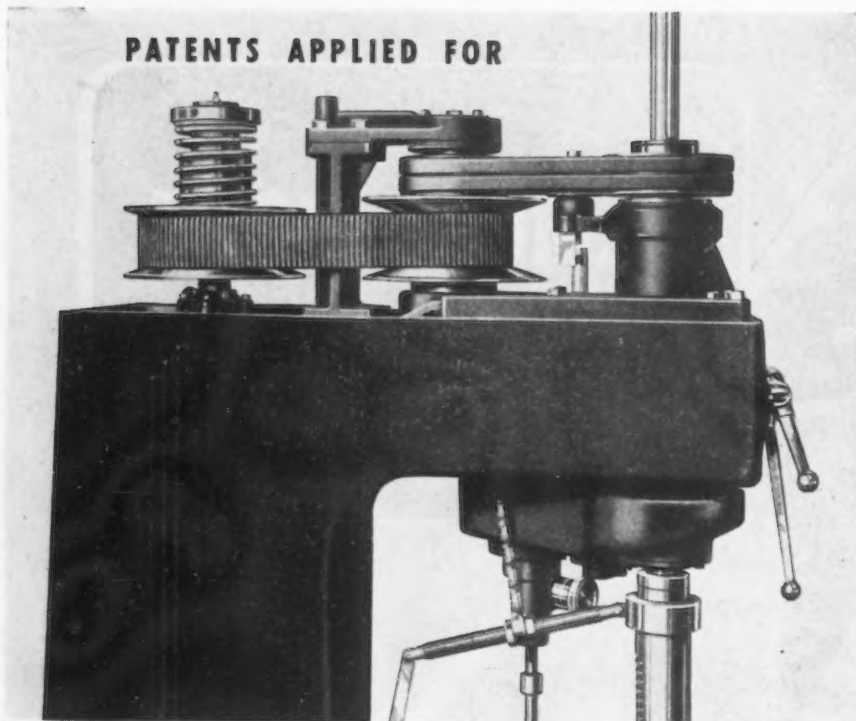
MILWAUKEE • WISCONSIN • HOUSTON • TEXAS

Offices at: NEW YORK, PITTSBURGH, CHICAGO, TULSA, HOUSTON, LOS ANGELES, SEATTLE

In Canada—JOHN INGLIS CO., LIMITED



PATENTS APPLIED FOR



## This is the "RPMster" Drive—

• We almost said the "brains"—but it's really the drive. It provides—at a touch of a lever a vast number of speeds between 175 rpm and 3,000 rpm. The "RPMster" is massive, rugged, streamlined. It has such features as six-spline alloy steel spindle, positive drive all-gear semi-automatic feed, alloy steel back gears. Capacity of the No. 2 machine is 1", of No. 3, 1-1/2" in cast iron.

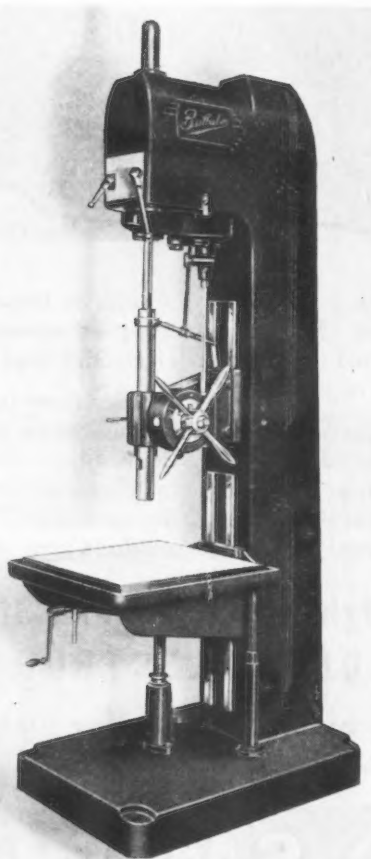
Speeds are changed INSTANTLY—with motor running.

This machine fits into any production program and any tool-room will find it ideal. You should be interested;—the price is moderate—and deliveries are now reasonable. Write for Bulletin No. 3257 and prices.

**BUFFALO FORGE COMPANY**  
492 Broadway Buffalo, N. Y.

Canadian Blower & Forge Co., Kitchener, Ont.

*"Buffalo"* **"RPMster" with 100 Speeds**



blight of unemployment. "My companies propose to prepare a plan which we will submit to both industry and labor. It may not be the best plan, but at least it will be a practical one. That, certainly, is more than we could ever expect from the occupants of Washington's ivory towers."

Members present at the meeting drew the conclusion that Col. Rockwell intended to release details of a postwar employment security plan in the near future, possibly at a meeting in New York later this month. Rockwell would not confirm this speculation, but did not deny that his companies are now engaged in assembling such a plan for some future presentation to industrial and labor leaders.

### Excess Army Construction Materials Redistributed

*Washington*

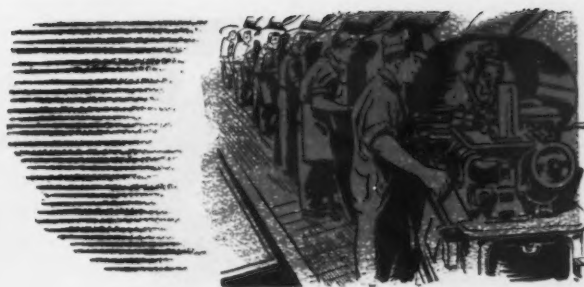
• • • Excess construction materials valued at approximately \$150,000,000 were salvaged from completed Army projects through redistribution to incomplete Army projects and to other war activities in 1943 by the Redistribution and Salvage Branch, Office, Chief of Engineers, the War Department announced. At present, redistribution of all excess Corps of Engineer property, military and nonmilitary, is proceeding at the rate of about \$11,000,000 a month.

Prior to 1943, war construction was of such volume that surplus materials from any one project were easily absorbed by some other project. Early in 1943, however, war construction program was so nearly completed and construction had been so drastically curtailed that excess materials began to accumulate. These were utilized on remaining Army construction projects as far as possible. During the first six months of the year it is estimated that materials valued at \$75,000,000 were redistributed as a part of the specific effort to utilize existing stocks, thus saving the purchase of that amount of additional material.

During the last six months of 1943, the war construction program of the Army decreased so greatly that additional steps had to be taken to dispose of excess stocks. Large quantities of such materials were transferred to other war activities, including Navy construction projects. It is estimated that approximately another \$75,000,000 in excess construction materials were disposed of in this manner in the last six months of the year.

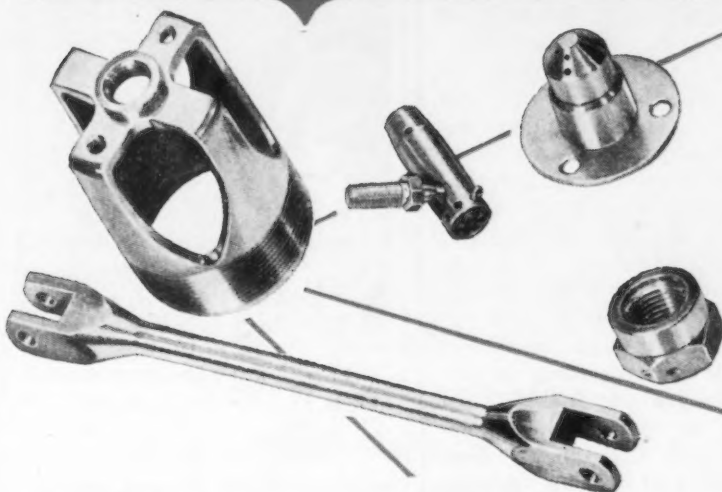
# Everything

## IT TAKES TO MAKE YOUR SCREW MACHINE PARTS



### TOUREK'S EQUIPMENT

Tourek's modern plant is equipped with a large battery of the latest model automatic screw machines, with the necessary supplementary equipment and complete tool room facilities.



### TOUREK'S INGENUITY

Tourek's Engineering Staff knows how to take the fullest possible advantage of the screw machine process for the automatic production of precision parts.

## Take it to Tourek!

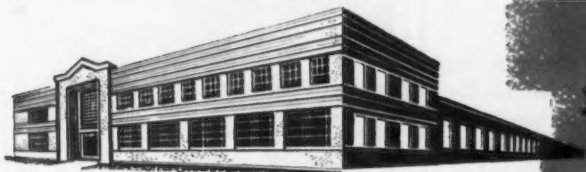
To supply your precision screw machine parts, Tourek goes to work with resources organized to serve your own special needs. Tourek's modern, complete *equipment*... Tourek's engineering *ingenuity*... and Tourek's long, successful *experience* are coordinated perfectly at every step from blueprint to final delivery. And the results can't help but be right—your parts made *exactly* as you want them.

While we are producing now to the full limit of our facilities, we are eager to be of service. Why not consult us on your postwar screw machine parts problems?



### TOUREK'S EXPERIENCE

To the solution of your own special problems Tourek brings to bear a full quarter of a century of successful, volume manufacture of screw machine parts of the most intricate design and precise dimensions.



MAKERS OF THE FAMOUS  
TOUREK BALL JOINTS

Established 1919

# J. J. TOUREK MFG. CO.

## PRECISION SCREW MACHINE PARTS

4701-11 West 16th Street

Chicago 50, Illinois

## PUNCH-LOK

### Streamlined HOSE BANDING METHOD



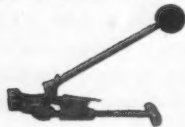
**SPEED-SAFETY-ECONOMY**  
In Clamping-Splicing-  
Repairing-Mending-  
Tieing-Reinforcing

PUNCH-LOK Streamlined Hose Banding Method is being used in hundreds of production and maintenance jobs in all industries for connecting high-pressure hose; splicing electric cable; stopping leaks in steam and water lines; reinforcing and mending splits in cross-arms and ladder rails; tying rigid conduit or flexible cable to existing pipe lines or girders; tying ends of wire or manila rope to prevent fraying—and many other jobs. PUNCH-LOK is giving wartime industries a fast, safe, economical, quality banding method. Investigate NOW the many advantages it will have for you in your present and postwar work. Let PUNCH-LOK solve your clamping or banding problems!



**CLAMPS**... Made of flat, high tensile, galvanized steel, double wrapped. Available from  $\frac{3}{8}$ " to 48" I.D. Any large size clamp

can be pulled down and made into a smaller size.



**LOCKING TOOL**... Sturdily constructed to assure long life. Locks all size clamps with a tensional pull of 1,000 lbs. Hammer punches and breaks excess band flush at clip.



**GROOVED FITTINGS**... For water or steam lines. Permits application of high pressure clamping without damage to hose.

Write for Descriptive Catalog and Name of Local Distributor

**PUNCH-LOK**  
COMPANY

Dept. K, 321 N. Justine St.  
Chicago 7, Illinois

## Nash-Kelvinator Gets Propeller Contract

**Detroit**

... Large scale production of new four bladed propellers and an improved 2100 hp. two stage, supercharged aircraft engine, which combined will increase the speed and carrying capacity of Navy Corsair and Hellcat fighters, will soon result in a shift of Nash-Kelvinator's war production activities, it was disclosed by George W. Mason, president.

Neither of the new contracts, involving "substantial orders," will interrupt the company's current assembly line production of three bladed Hamilton Standard hydromatic propellers and two stage, supercharged Pratt & Whitney 2000 hp. engines. The new program would be in the nature of a rapid, but orderly transition toward the output of these advanced and more powerful units.

Mason said that according to Admiral Ramsey the new R-2800-C engine cannot be matched in power-weight ratio by any known Axis products. Rated at 2100 hp. "greatly increased" horsepower can be obtained with the new two stage, supercharged engine using water injection.

Mason expressed "appreciation of the wholehearted cooperation given Nash-Kelvinator by United Aircraft Corp. in the manufacture of their products." He summarized United Aircraft's products made by his company as including three and four-bladed Hamilton Standard hydromatic propellers, propeller governors, the new Pratt & Whitney 2100 hp. supercharged R-2800-C engine, and Sikorsky helicopters.

Commenting on the switch to the four bladed propellers, Mason pointed out that the increasing power of aircraft engines is rapidly overtaking the limits of three bladed propeller efficiency and thus in order to utilize fully the extra horsepower of such engines as the new Pratt & Whitney R-2800-C, four bladed propellers are necessary.

## Ford Blast Furnace Down

**Detroit**

... An iron breakout through the hearth of one of the Ford Motor Co. blast furnaces last week necessitated its shutdown and relining up to the mantle. The furnace is expected to start up again late next month. Pig iron inventories will carry the Ford battery of open hearths until the repairs are completed.

THIS  
**HOBART**  
WELDER can  
work to your PROFIT—



...Both, Now  
and After the  
War is Ended.

Speed production,  
cut costs, and have  
a better, stronger,  
product — "Arc

Weld" it. Hobart Welders give you advantages and speed not found in others. Exclusive Remote Control which lets the operator adjust current right at the work is just one of Hobart's advantages. Why not write us today for details on this unusual machine. We'll send you a digest of ideas on how you can apply welding technique to your work.

HOBART BROS., Box 1A-534, Troy, Ohio

• Write for catalog!



**HOBART**  
"One of the World's Largest Builders of  
Arc Welders"





## HERE'S YOUR PRODUCTION "BLOCK-BUSTER"!

### WATCH IT BLAST PRODUCTION "LOG-JAMS" AND KNOCK DOWN COSTS!

In numerous war production plants today, this handful of metal is demonstrating a new idea in methods and costs. It is proving that precision parts can be produced in volume, without hard-to-get special machinery. This "package-of-precision" is the quill of a Dumore Grinder, itself a noteworthy example of scientific design and precision manufacture. More noteworthy are its "Production-with-Precision" possibilities, when used in conjunction with standard machine tools, converting them in effect to production grinders, at remarkably low cost.

You can facilitate conversion to different production requirements, keep quality *up* and costs *down*, by taking full advantage of this adaptable, high-precision tool.

Get the full story of the "Dumore System" from your industrial distributor, or write direct to The Dumore Company, Tool Division, Dept. TE24, Racine, Wisconsin.



Dumore quill, set in special mounting, used for precision grinding of steel pins, a production application of first importance in the war effort, and an example of the adaptability of this tool to a wide range of work.



# DUMORE

PRECISION AND  
OFF-HAND GRINDERS

SOLD BY AUTHORIZED INDUSTRIAL DISTRIBUTORS IN ALL PRINCIPAL CITIES

You're looking  
at something  
that "couldn't  
be done"!



DOUBLE  
SIZE

It's an upset job, *cold-headed* with perfect flow of metal in the collar head for extra strength; *thread rolled* for a tough, accurate, long-wearing Class 3 fit.

This aircraft cylinder holdown screw formerly milled from bar, with high percentage of material scrap loss, now is upset in cold headers, saving material, providing extra strength and toughness, in larger volume at a lower cost, and a quality *better than specified*.

Are you held within the limits of "screw machine" production? Come to Corbin, where thousands of modern machines and years of precision experience enable us to plan and produce each job the *best* way.

Some of our facilities may be available now. Send us your blueprints and specifications for prompt, helpful study of your precision requirements.

**THE CORBIN SCREW CORPORATION**  
*The American Hardware Corporation, Successor*

★ NEW BRITAIN, CONNECTICUT

P-3A



## NEWS OF INDUSTRY

### "Profit and Loss"

••• In a vein of acid humor, Don Knowlton of Hill & Knowlton, public relations counsel, Guildhall Building, Cleveland, has illustrated by a homily example the inconsistencies forced into corporate financial reports by inclusion of data on postwar tax refunds and renegotiation. In the pamphlet, "Profit and Loss," George Spelvin operates a farm fruit stand, but the accounting summersaults he goes through as he adds to plant (to supply applesauce to a neighboring war plant) are a simplified version of annual statements of big corporations, which the author implies no longer reflect the actual cash position of the company. He concludes that today corporations find themselves compelled by law to publish figures that give the public, who think reported profits represent cash, a distorted and fantastic conception of "war profits."

### Labor Balance Best Since Start of War

#### New York

••• Apart from rising seasonal requirements for farm labor, current manpower needs appear to be in better balance with labor supply than at any other corresponding period since the war began, according to the National Industrial Conference Board. The plateau in manpower needs on the home front, which became evident in the board's employment figures in the closing quarter of last year, has continued in the early months of this year.

Demands for farm labor were primarily responsible for a net gain of approximately 300,000 in employment during March. The total number at work and in the armed forces rose to 61.3 million compared with 60.9 million at the beginning of the year and 59.5 million in March, 1943.

In manufacturing, employment has declined by more than 200,000 since last year, while the number at work on construction has dropped by 750,000 and was less than half of the corresponding total in the initial months of the war. Total employment in the nation's five basic industries—minerals, manufacturing, construction, transportation, and public utilities—was well over half a million lower in the initial quarter of 1944 than a year ago. Of the 20 major manufacturing groups only three increased in the number of their payrolls.



Because we check and double check throughout every operation in manufacture . . . YOU can dig into any case of Corbin Screws and throw them into your trays or hoppers with assurance that they will speed your assembly operations, lower your assembly costs . . .

### Look to CORBIN

for your requirements in Screws and Nuts . . . a full range in both



**CORBIN-PHILLIPS**

and



**REGULAR SLOTTED**

Also AIRCRAFT Screws and Nuts to Governmental specifications.

### See your Distributor

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**THIS MACHINE**  
*had a part*

*...in many a*

## LANDING OPERATION



It's a 10-foot open-side planer, machining bed-plates for LST Landing Craft—and, as one of the units among PSF's modern and complete finishing facilities, it can have a part in many a future manufacturing operation of yours. We're equipped to handle any steel casting work, with the latest methods and equipment in use at every step. PSF means *quality* castings and *accurate* machining—include them in your plans.

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TOMORROW'S ACCURACY TODAY  
**CLARK**  
**HARDNESS TESTER**  
**FOR "ROCKWELL" TESTING**

## Gas Turbine Applications Discussed By Salisbury, GE Turbine Engineer

• • • J. Kenneth Salisbury of General Electric's Turbine Engineering Division, at the national meeting of the ASME Oil and Gas Power Division, in Tulsa, indicated that the gas turbine offered attractive possibilities for certain applications, on land, sea, and in the air, but that it should not be regarded as a prime mover that will completely replace existing types used in those fields. He cited the improbability of the gas turbine replacing large steam turbines in central stations as a case in point.

"The large volumes of air required tend to limit the rating of gas turbines to values which are lower than present steam turbines by rather wide margins. The gas turbine is usually considered not to be a competitor of the large, efficient steam plant, but rather as complementary, as a reliable simple prime mover of intermediate capacity."

The gas turbine plant seems to have more potentialities as a coal burner than the diesel, Salisbury said. "Actually neither is yet operating commercially in this country on coal, and some of the European efforts at burning coal in a reciprocating engine have been abandoned as not too promising. If the gas turbine plant can be operated on coal, its rather modest thermal efficiency can be converted into an excellent dollar efficiency."

Discussing possible additions to the basic gas turbine for increasing its efficiency, Salisbury pointed out that it has long been known that regeneration is attractive.

When the waste heat of the hot exhaust gases is used to preheat the air discharged from the compressor there is a reduction in the fuel re-

quired in the combustion chamber, and great improvement in the fuel economy, he said. Salisbury stated, however, that large pressure drops in the regenerator can have drastic effects on the fuel rate. "This fact emphasizes the necessity for careful design of gas and air passages," he said.

In discussing possible applications of the gas turbine, Salisbury stated that General Electric has recognized its particular adaptability for use in locomotives and has made rather extensive studies of a 4500 hp. locomotive powered by a single gas turbine unit, with a regenerator and waste heat boiler.

The thermal efficiency of this locomotive, its ease of assembly, accessibility, lightness of weight, and smooth flow of power all indicate that it is an attractive application, he said. Salisbury said that dynamic braking is a feature of the gas turbine locomotive which has interesting possibilities for mountainous terrain.

Marine applications have also been considered and a scale model 3000 hp. gas turbine power plant designed for marine use has been built. Explaining that provision must be made for maneuvering and astern operation in marine applications, Salisbury said that for d.c. electric drive, the high torque requirements at the time of reversing can be met by maintaining nearly full speed on the set. Reversing can, of course, be accomplished electrically. Another promising arrangement for marine applications is the variable pitch propeller, permitting independent control of the gas turbine set speed. This allows the operator to obtain best thermal performance from the gas turbine set at

### The Gas Turbine

#### What Is It?

The constant pressure combustion gas turbine consists in its simplest form of a compressor, a combustion chamber, and a turbine. The term "constant pressure" is used to distinguish this particular machine from the explosion gas turbine. It does not mean that pressure is constant for operation at all loads, but rather that a steady flow process is used.

#### How does it operate?

Air is compressed in the compressor to several atmospheres pressure and then taken to a combustion chamber into which fuel is injected. The burning of fuel, raises the temperature of the compressed air, which is passed through the turbine to produce power.

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TO PARTS  
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## *Controlled* **DENSITY AND PRECISION** *in small parts*

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In specific part applications of iron, steel, bronze and other metals, Pomet can give you high technical density, close tolerances and fine finish. Pomet produces these parts to uniform standards at substantial savings in machining, time and material.

Pole pieces for fine instruments, small motors and recording devices also exemplify Pomet precision techniques. Density and purity are closely controlled to insure high permeability and low residual magnetism. Tolerances are held to plus or minus .001" or closer. Contours are formed to high precision standards.

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Pomet Powder Metallurgy is unusually economical in quantities of 100,000 or more. Consult our Engineering Department on design problems where the application of powder metallurgy is indicated. Send for literature.

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COMBINED MATERIALS  
WEAR RESISTANCE

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A SUBSIDIARY OF GENERAL BRONZE CORPORATION

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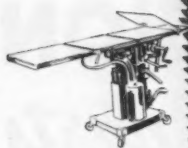
Long Island City, N. Y.

DON'T DECIDE UNTIL  
YOU SEE WHAT  
POMET CAN DO



## Capewell Band Saw Blades Stand Up Longer

*Says Manufacturer of  
Surgical Equipment for War*



This manufacturer, cutting both cold rolled and stainless steel, produces surgical cabinets, operating tables and naval galley equipment. On this type of work sawing operations are watched closely — and it was found that Capewell metal cutting band saw blades stand up longer . . . Try them on your tough job.

THE CAPEWELL MANUFACTURING CO.  
Hartford, 2, Conn.



**Saw Blades**

HACK SAW BLADES • CONTOUR SAW BLADES  
METAL CUTTING BAND SAW BLADES  
WOOD CUTTING BAND SAW BLADES

all times, and greatly facilitates the maneuvering problem.

Discussing aircraft application, Salisbury said that the experience of the present war has indicated that the future range of size required for aircraft engines may be from 2000 to 8000 hp.

The light weight internal combustion engine seems to be approaching a rather definite limit in rating, he said. "The gas turbine, on the other hand, just comes into its own in the

sizes at which the gasoline engine seems to be approaching a limit. Furthermore, it does not require expensive high octane fuel for its operation. It is quite apparent that one potential gas turbine application is in the post-war cargo and transport plane field."

In addition to the applications he discussed, Salisbury said that the gas turbine plant will undoubtedly continue to be used in various oil refining processes, and as a supercharger for boiler furnaces.

## B & O Tests Radio For Railroads

••• Ultra-high frequency radio, similar to that used in some types of aircraft, is being experimented with for railroad usage, after investigation begun nearly a year ago by Baltimore and Ohio Railroad Co. The experiments are being carried on jointly by the B & O and the Radio Division of Bendix Aviation Corp.

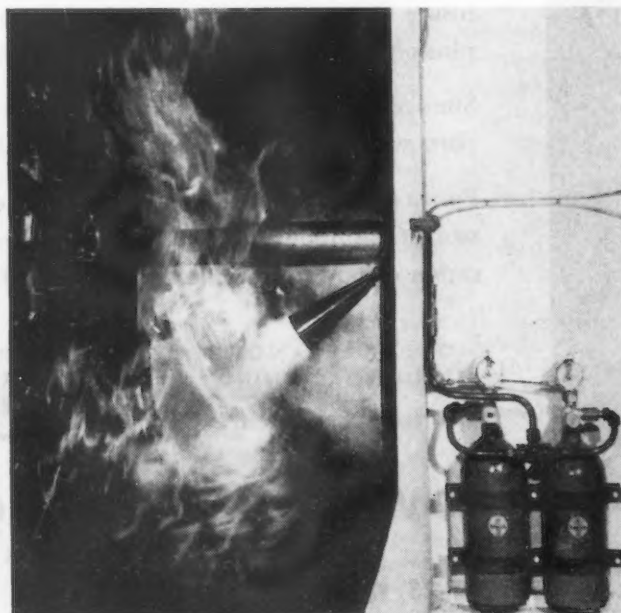
The Federal Communications Commission announced that permits had been granted for the construction of five radio transmission stations on the B & O between Baltimore and Pittsburgh. Four of the stations will be mobile transmitters.

In the ultra-high frequency range, transmission of radio signals is limited to a relatively short range, in general distances only slightly greater than "line of sight" can be expected. This in many respects is an advantage for some types of services. It permits, in connection with the highly directional antenna systems possible, a system to be so designed that it will provide satisfactory com-

munication over only the area desired and will not cause interference with systems in adjacent areas. This, in connection with the use of frequency modulation, will allow many channels to be operated in the same area with a minimum of interference.

Bands of radio frequencies have not been allocated for permanent railroad use. Neither the railroads nor the radio industry has sufficient information about this type of service to intelligently ask for specific bands of frequencies at this time. Commercial radio equipment is not being manufactured at this time that is suitable for railroad use.

In order to correct some of these conditions, the experiment being conducted will help to determine how radio communication can be used to best advantage to insure greater safety and prompter handling of train movements, and what technical features are necessary and desirable for this type of service.



TANK FIRES: For fires in the engines of tanks and other similar vehicles, the Walter Kidde & Co. has devised an automatic carbon dioxide fire extinguishing system. Tug of a control handle opens the valve in the storage cylinder (at right) where gas is held under high pressure in liquefied form. It does not damage the engine, wiring, or other parts.



# Retracting and Repositioning Work Within .0002 OF AN INCH—By Push Button

## DEVLIEG

No. 3A  
3" Bar

## JIGMIL

Arrow shows direction of retracting and repositioning movement

The most frequently needed function in a precision boring machine is that of retracting the work to facilitate measuring and tool setting.

In the DeVlieg Jigmil, this function is automatic—by fingertip control. Operation of a push button unlocks the table and moves it by rapid traverse to the desired position for measuring. For repositioning, operation of a single push button will cause the table to return to its cutting position by rapid traverse, stopping and locking automatically. Uniformity of selected position for stopping and locking is dependable within .0002".

The DeVlieg Jigmil is a new type machine—has the spacing accuracy of a Jig Borer — Performance Qualities of a Milling Machine—Convenience and Flexibility of a Horizontal Boring Mill. All control is so centered and organized that the operator never has to take his eyes off the work.

Thus, the Jigmil fulfills the machine tool ideal—a powerful and accurate extension of the operator's hand.

Many machines show 75 per cent greater average daily productivity.



## DEV LIEG MACHINE COMPANY

450 FAIR AVE. FERNDAL (DETROIT) MICHIGAN

*Write for Circular*

DEV LIEG  
MACHINE  
TOOLS

# Toss that EXTRA TOUGH DIE PROBLEM In OUR lap

Using Strenes Metal, we'll cast your dies to shape, (usually to 1/16") and save you around 50% to 75% on machinery time. What's more you'll put to work a die that will stand up—draw and form far more stampings than you probably believe possible. Deep draw runs of 1,000,000 and more parts a matter of record.

You'll be using a die that will require redressing far less frequently than dies of ordinary metal. Sounds good, but, hard to believe, you say! Perhaps. But our suggestion stands "Toss us that tough one" and pay for it when Strenes makes good as claimed—otherwise there will be no charge.

**THE ADVANCE FOUNDRY CO.**  
Dayton 3, Ohio

Refrigerators  
Stoves  
★ Automobiles  
★ Trucks  
★ Tractors  
Metallic Vaults  
Metallic Caskets  
Farm Equipment  
Fans, Blowers  
Bicycles, etc.  
★ In automotive field in general use for drawing and forming car bodies, hoods, fenders, head lights, radiator shells.

**Strenes**  
**METAL**  
**DRAWING AND**  
**FORMING DIES**

## Annealing Aircraft Parts in Pan American Shops

(CONTINUED FROM PAGE 61)

just sufficient to keep the burners in operation. North American adjustable port valves are used. They are set to give a pressure drop of 4 oz. By actually sizing the valve to the demand in this manner, the flow through the valve in its various positions can be accurately controlled.

With an enormous storage of heat in the molten salt, and with a well insulated setting, it can readily be imagined that one of the main difficulties of operation is to keep the temperature from rising if the burners remain on with no work being heated in the furnace. It has been found that the salt bath temperature can be automatically controlled within plus or minus 5 deg. F. by operating on the lowest 12 burners. A fair idea of the magnitude of heat storage may be obtained when it is realized that it takes seven days for the salt temperature to drop 700 deg.

The initial lighting of a furnace of this size with completely enclosed setting and with a large number of burners presented a problem, especially since one end of the furnace is only 4 ft. from an exterior building wall. This precluded the use of a long torch inserted from the end of the furnace. A satisfactory piloting system was worked out by applying small sealed-in pilot burners to the 16 Duradant burners at the uppermost level. These pilot burners are manifolded in groups of four and are of the premix type using air at approximately 8 oz. pressure. They fire into specially constructed burner tunnels which line up with the lighting holes in the burner blocks. To obtain the proper alinement of the pilot burners, to ram the tunnels and to center the pilot burner supporting brackets, a single mandrel was developed. Although experiments had indicated that these pilots would ignite the Duradant burners without any delay, extra precautions were taken. Small baffles made of 1/4x1/4 in. Inconel strip were placed about 1 in. in front of the face of the lighting holes so that the pilot flames are deflected downward in front of the burner cups. Ignition therefore takes place instantly. When the top row burners are lighted, the pilots are turned off. The burners in the middle and lower rows are then ignited from the burners above.

As a safety feature, the gas supply to each half of the furnace passes through an Eclipse Dual-Lock valve which automatically closes upon the

failure of either the gas or air pressure. When once closed, this valve must be opened manually before gas again becomes available at the burners.

## Radius Broaching of Turbine Buckets

(CONTINUED FROM PAGE 59)

thread cutting oil is employed as coolant.

The machine itself is flexible. As built for the Elliott Co., it is ready for service on a 22-in. radius bucket shank, but variation of 4 in. on the radius either way is possible by lengthening or shortening of the broaching arm by inserting a sizing block between the detachable end of the arm and the base section.

Damage to the workpiece by an inadvertent return of the broach across the work is prevented by an interlocking device on the hydraulic actuating valve, which requires the operator to remove the piece from the fixture before returning the broach to starting position.

## March Earnings Higher And Employment Falls

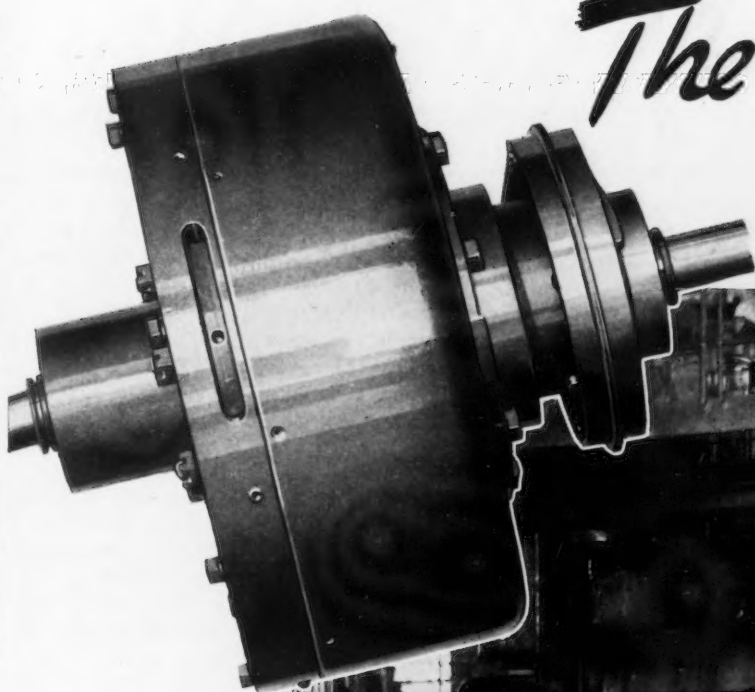
New York

• • • Hourly and weekly earnings, as well as the "real" weekly earnings, of workers in manufacturing rose to new peak levels in March, according to the regular monthly survey of 25 industries by the National Industrial Conference Board. The length of the work week was longer than in any other month in recent years, but remained below levels existing prior to April, 1930.

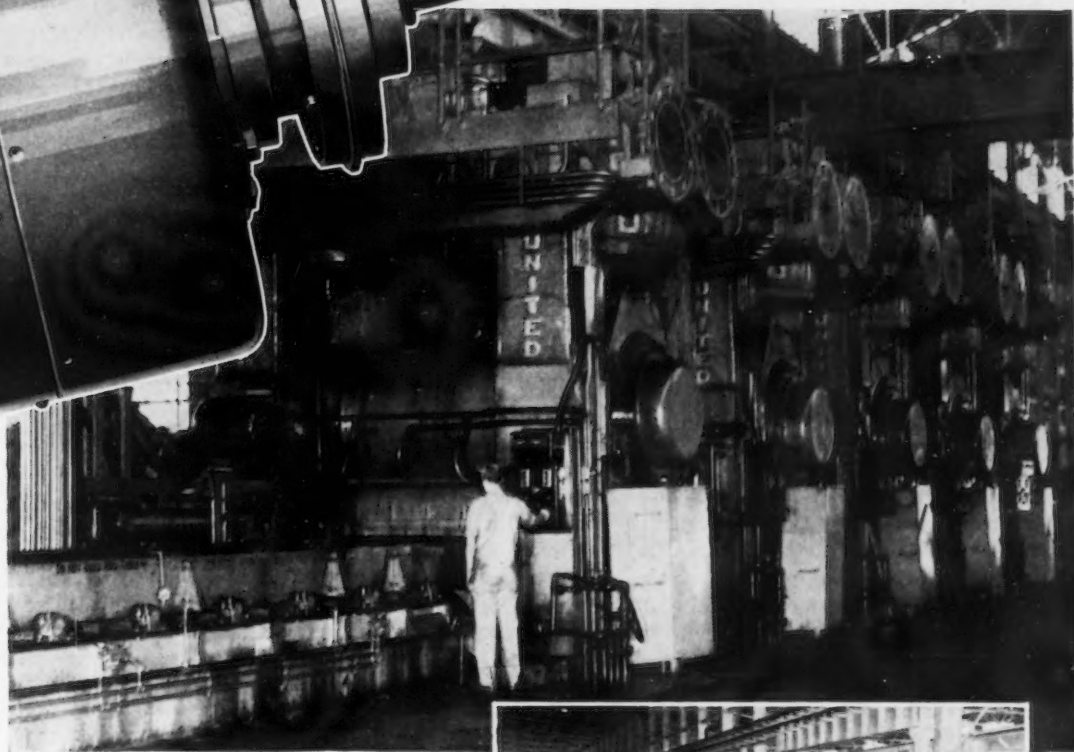
Employment in these industries, which has been showing a slight downward trend for several months, declined 1.8 per cent in March, with the result that total manhours worked and payrolls were likewise off. Wage rate increases were negligible.

At \$1.052, hourly wages were 0.4 per cent higher than in February, 6.6 per cent higher than in March, 1943, and 38.6 per cent above January, 1941, the base date of the Little Steel formula. Weekly earnings rose to \$48.36 on the average which was 0.4 per cent higher than in February; 9.2 per cent above March a year ago; and 58.0 per cent above January, 1941.

# The "MILL-TYPE" Clutch



Right: 28" & 54" x 80" 5-stand tandem hot finishing train equipped with five 24" Type SD Dings Magnetic Clutches.



## Dings Magnetic Clutches . . . Accepted Standard of Leading Mills Everywhere.

Dings Magnetic Clutches are ideally suited to control of screwdown on mill stands and for other power transmission jobs where smooth, dependable operation and remote control are desirable.

Dings clutches take hold of the load smoothly and release it with no drag. Special design keeps lubricant away from friction surfaces. High torque is insured by proper relation between friction area, mean diameter, coefficient of friction and pressure. Frictions are long lasting and easy to replace. The magnet is wound for years of trouble-free service.

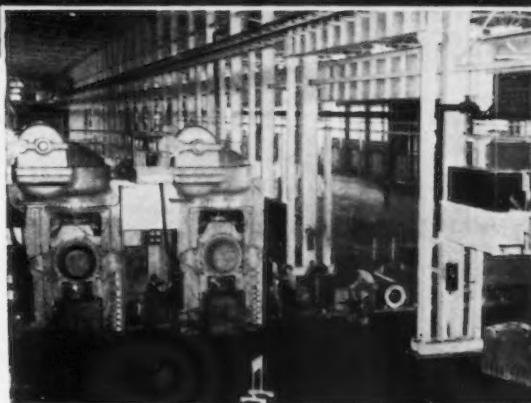
Dings—magnetic engineers since 1899—pioneered heavy duty magnetic clutch design. Call on them for trouble-free transmission.

**DINGS MAGNETIC SEPARATOR CO.**  
516 E. Smith St., Milwaukee 7, Wis.

World's Largest  
Exclusive Builders  
of Magnetic  
Equipment

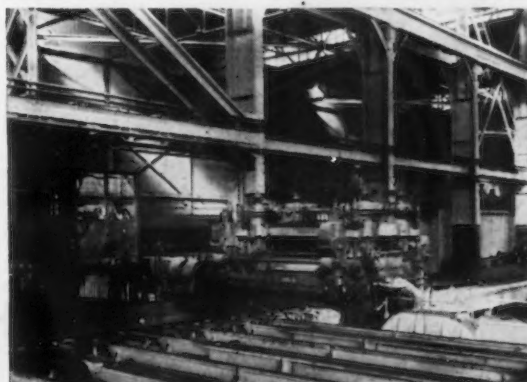
**Dings**  
MAGNETIC  
SEPARATION 

Magnetic Separators . . . Lifting  
Magnets . . . Magnetic  
Clutches



Below: 110" plate mill, heavy leveler, equipped with Dings Magnetic Clutches.

Above: Two stand tandem 20" & 49" x 71" cold reduction mill at large aluminum plant — with Dings Clutch on each stand.





# MACHINE TOOLS

... News and Market Activities

## Idle Tool Plan May Be Altered

### Cleveland

•••The original purpose of the semi-mandatory reporting instructions regarding idle and excess government owned machine tools which started officially on April 1, appears to be falling by the wayside. Idle tools so located are not likely to be channeled back into regular production plants in the regular way through straight WPB order screening.

It is understood here that the demand for machine tools for the "top urgency" munitions programs entering this and other areas has been so strong that many of these idle tools may be withheld from the regular market and doled out to urgency contract holders of only the most critical variety.

While the original purpose of the listing of idle government owned tools was so that these machines could be pushed to potential new machine tool buyers and thus get the machines off

of the government's hands, now the stringency is so great that WPB is expected to shunt prospective buyers having only "must" contracts into new tool purchases. Meanwhile this relatively small backlog of idle tools will probably be held for the top urgency users to assure the success of these programs. Pool order tools are considerably depleted and the capacities of the various tool builders are limited at present by the quantities of sub-contract work taken during poorer machine tool demand.

First, and unofficial, reports of the success of the original full scale listing of idle tools indicate that about 8000 such tools were registered nationally in the first reporting period between April 1 and 10. Of these less than 6 per cent are believed reported idle but not available. All of the balance could be made available on notice. The mixture of tools reported is said to have represented a

very good cross-section of types of tools and some few were of a direct importance to some urgent programs. A few were shell lathes but not necessarily of the sizes required by the new heavy caliber shell program.

## Tool Orders Jump

### Cincinnati

•••Reconversion back to the manufacture of machine tools on the part of a number of Cincinnati plants looms as the result of reports that increased ordering for machine tools will bring approximately \$25,000,000 more business to this area. Most of this information came from returning delegates to the National Machine Tool Builders Association meeting, and indicates that the new business currently will continue to rise until almost the same proportions of ordering will prevail as did approximately a year ago. A number of plants in this area have already received a substantial amount of orders and in several quarters it is reported that full scale production of machine tools is unquestionably going to be the rule for the remainder of this year at least. At the same time, manufacturers are also wrestling with the problem of speeding the increased demand with sufficient labor to man their present plants. War manpower officials have recently placed the entire area on a 48-hr. week, and constant warnings are going forth that unless the labor supply is kept up, the possibility of Washington refusing to send war contracts into this area is a strong likelihood.

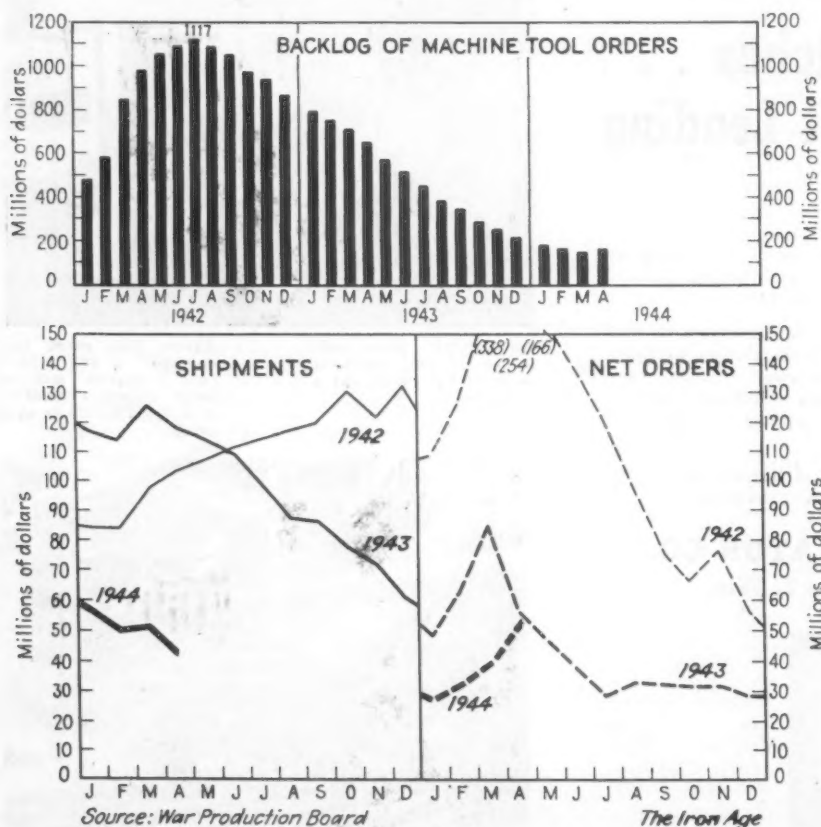
## Orders Exceed Shipments First Time Since 1942

•••Reflecting increased demand for machine tools as the result of recent new military programs, the total of new orders received by firms in April exceeded monthly shipments of machine tools for the first time since August, 1942, according to a preliminary report for April issued by the tools division of the WPB.

Machine tool shipments in April were valued at \$42,149,000, a decrease of 18.6 per cent from the March total of \$51,780,000. Orders received totaled \$56,591,000, an increase of 33.9 per cent over March orders of \$42,264,000. Cancellations were \$2,351,000 in April, making new orders \$54,240,000.

The backlog of unfilled orders at the end of April was valued at \$166,867,000, an increase of 8.8 per cent over the total of \$153,370,000 at the end of March, according to the preliminary report.

The total of machine tool orders received has increased steadily in the last three months. Gross orders in February were 18.2 per cent over January, and in March were 20.3 per cent over February.



# QUICK DELIVERY!

## ON ALL STANDARD SIZES



# CADILLAC

*Thread Plug*

# GAGES

**I**MMEDIATE SHIPMENT of Thread Plug Gages in all standard sizes can now be made on orders for any normal quantity.

National Fine  
National Coarse  
0-80 to 1½-6

Also

Pipe Plug Gages  
⅛ to 1¼

In case any sizes are not in stock at the time your order is received, the delay in shipment will be hardly more than a day or two, as we manufacture thread plug and ring gages exclusively, and carry an unusually complete stock at all times.

Send us an order covering your immediate requirements. If you must have overnight shipment, wire us.

**WIRE  
YOUR ORDER  
TODAY!**



**CADILLAC GAGE COMPANY, Detroit 5**

# NON-FERROUS METALS

... News and Market Activities

## Copper Output Falls Below Estimate

... Outlining the current position of copper and copper products, WPB announced that production of refined copper during the first quarter of this year fell below previous estimates, primarily because of manpower difficulties.

Michael Schwarz, director of the Copper Division, referred to his statement of March 18 to the effect that output of domestic mines during 1944 was expected to be less than during the previous year and urged that as full domestic production of copper as possible be maintained with such labor as remains available.

The supply of unalloyed copper scrap, red brass scrap, and composition scrap continues to be insufficient to meet the requirements of producers of military and essential civilian items, WPB said. Even in the case of brass rod turnings, there appears to be no excess supply over present requirements.

The position as far as controlled materials are concerned was described by WPB as follows:

1. It is anticipated that alloy strip production will be slightly lower than the current rate primarily because of summer heat and a small reduction in military demand. It is hoped that reduced production of alloy strip will release casting capacity for production of alloy rod and tube.

2. Alloy rod is expected to remain

extremely critical through the end of the third quarter because of increased demand for all sizes.

3. The position of alloy tube is expected to remain critical through the end of 1944 because of accelerated military programs. Facilities as well as manpower will limit the production of this product in certain sizes.

4. The demand for unalloyed copper products appears to be approximately in balance with supply.

5. Copper wire and cable as a whole are in tight supply. Production as limited by such factors as loss of manpower, short supply of cotton and asbestos yarn and the necessity of working with new and as yet unproven materials for electrical insulation.

6. Certain classes of foundry products remain tight. Requirements for brass and bronze castings can be met provided there is no substantial loss of manpower.

### Nickel Order Modified

Conservation Order M-6-b, governing the use of nickel, secondary nickel, nickel scrap, nickel salts, oxides and carbonates under Conservation Order M-6-b has been amended effective May 16, the War Production Board announced May 17. Modifications of the order deal with rules governing the use of nickel solutions, and for nickel in necessary resistance materials.

The amended order prohibits the use

of nickel, except where necessary for operational purposes, in the following items which make up list A of the order:

Transportation equipment; building supplies, hardware, ornamental metal work; plumbing, heating and air conditioning supplies, and domestic and institutional appliances and equipment; commercial electrical appliances and domestic ranges; clothing accessories; furnishings and furniture.

Commercial and industrial appliances and equipment and parts thereof; jewelry, toilet articles, accessories, souvenirs, novelties, games, toys, art objects and musical instruments; plating; containers of all types; branding, marking and labeling devices; fire fighting apparatus and equipment; lighting equipment.

Non-operating or decorative uses or parts of installations and mechanical equipment, including frames, bases, standards, and supports; photographic and art equipment and supplies; sporting and pleasure boat fittings and hardware; saddlery and harness hardware and fittings.

Nickel may be used in the manufacture of articles omitted from the list only for any purpose authorized by the WPB regardless of whether or not the used nickel was allocated or, where allocated, to the user subject to any specific directions issued in connection therewith.

Nickel scrap and second nickel may be used where not prohibited, but only to fill a purchase order to which a preference rating of AA-5 or higher has been assigned. Exceptions to the prohibitions are implements of war as defined by the order.

### Cadmium Inventories Permitted

... Users of cadmium are now permitted to maintain a 30-day inventory of cadmium-containing items, based on current rate of deliveries, through WPB amendment to Order M-65. The amended order also provides that laboratory supply houses engaged in buying and selling cadmium to laboratories will be considered as "distributors."

Previously, manufacturers of cadmium-containing items were prohibited from accumulating any inventory and could manufacture and deliver permitted items only upon receipt of a certified order. Under the new provisions, a manufacturer may maintain a thirty-day inventory, but may not deliver the cadmium-containing items until he is in possession of a certified order.

## Slab Zinc Output, Shipments and Stocks

(In net tons)

Commencing with 1940, production from foreign ores is included in this report which reflects the TOTAL OUTPUT of slab Zinc of ALL GRADES, as reported by ALL PRODUCERS represented in the membership of the American Zinc Institute.

	Stock at Beginning		Production	Total	SHIPMENTS Export and Drawback		Total	Stock End of Period	Unfilled Orders End of Period	Daily Average Production
	Beginning	Production			Domestic	Total				
1943										
January	89,458	83,870	173,328	66,925	10,296	77,221	96,107	69,426	2,705	
February	96,107	76,667	172,774	66,552	8,210	74,762	98,012	66,920	2,738	
March	98,012	83,787	181,799	66,111	9,922	76,033	105,766	62,879	2,703	
April	105,766	81,057	186,823	73,131	5,650	78,781	108,042	60,260	2,702	
May	108,042	82,399	190,441	75,225	4,201	79,426	111,015	60,212	2,658	
June	111,015	78,865	189,880	68,271	5,920	74,191	115,689	57,879	2,629	
July	115,689	80,249	195,938	67,549	3,229	70,778	125,160	51,819	2,589	
August	125,160	79,736	204,896	68,953	2,857	71,810	133,086	49,617	2,572	
September	133,086	79,361	212,447	68,180	980	69,160	143,287	49,147	2,645	
October	143,287	83,066	226,353	69,845	2,101	71,946	154,407	41,532	2,680	
November	154,407	79,834	234,241	73,739	1,769	75,508	158,733	41,034	2,661	
December	158,733	83,165	241,898	67,159	1,073	68,232	173,666	44,914	2,683	
		972,056		831,640	56,208	887,848				
Monthly Average		81,005		69,303	4,684	73,987		Daily Average	2,663	
1944										
January	173,666	84,066	257,732	60,489	3,148	63,637	194,095	48,203	2,712	
February	194,095	79,894	273,989	61,238	1,458	62,696	211,293	48,350	2,755	
March	211,293	86,037	297,330	83,116	1,327	84,443	212,887	32,519	2,775	
April	212,887	80,405	293,292	74,694		74,694	218,598	32,058	2,680	



## NON-FERROUS METALS

### REFINER, SMELTER PRICES

(Cents per lb. unless otherwise noted)

Aluminum, 99+%, del'd	15.00
Aluminum, No. 12 Fdy., (No. 2)	12.00
Aluminum, deoxidizing grades	11.00 to 12.25
Antimony, Asiatic, New York	Nominal
Antimony, American, f.o.b. Laredo, Tex.	14.50
Arsenic, prime white, 99%	4.00
Brass, 85-5-5-5 ingots (No. 115)	13.00
Cadmium, del'd	90.00
Cobalt, 97-99% (dollars per lb.)	\$2.11
Copper, electro, Conn. Valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Copper, beryllium, 3.75-4.25% Be, dollars per lb. contained Be.	\$15.00
Gold, U. S. Treas., dollars per oz.	\$35.00
Indium, 99.5%, dollars per troy oz.	\$7.50
Iridium, dollars per troy oz.	\$165.00
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9+%, carlots	20.50
Magnesium, 12-in. sticks, carlots	30.00
Mercury, dollars per 76-lb. flask, f.o.b. shipping point or port of entry	\$191 to \$193.00
Nickel, electro	35.00
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per oz.	\$35.00
Silver, open market, New York, cents per oz.	44.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.67

### Copper, Copper Base Alloys

(Mill base, cents per lb.)

	Extruded Shapes	Rods	Sheets
Copper	20.87		20.87
Copper, H.R.		17.37	
Copper, drawn		18.37	
Low brass, 80%		20.40	20.15
High brass			19.48
Red brass, 85%		20.61	20.36
Naval brass	20.37	19.12	24.50
Brass, free cut		15.01	
Commercial bronze, 90%		21.32	21.07
Commercial bronze, 95%		21.53	21.28
Manganese bronze	24.00		28.00
Phos. bronze, A, B, 5%		36.50	36.25
Muntz metal	20.12	18.87	22.75
Everdur, Herculeoy, Olympic or equal		25.50	26.00
Nickel silver, 5%		28.75	26.50
Architect bronze	19.12		

### Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

**Tubing:** 2 in. O.D. x 0.065 in. wall 2S, 10c. (1/4 H); 52S, 61c. (O); 24S, 67 1/2c. (T).

**Plate:** 0.250 in. and heavier; 2S and 1S, 21.2c.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

**Flat Sheet:** 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

**Extruded Shapes:** "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28 1/2c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

**Wire Rod and Bar:** Base price; 17ST and 11ST-3, screw machine stock. Rounds: 1/4 in., 28 1/2c. per lb.; 1/2 in., 26c.; 1 in., 24 1/2c.; 2 in., 23c. Hexagonals: 1/4 in., 34 1/2c. per lb.; 1/2 in., 28 1/2c.; 1 in., 25 1/2c.; 2 in., 25 1/2c. 2S, as fabricated, random or standard lengths, 1/4 in., 34c. per lb.; 1/2 in., 25c.; 1 in., 24c.; 2 in.,

23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27 1/2c.

### NON-FERROUS SCRAP METAL QUOTATIONS

(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums)

#### Copper, Copper Base Alloys

##### OPA Group 1

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

##### OPA Group 2

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.90*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.50
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.25

##### OPA Group 3

Yellow brass soft sheet clippings	8.625
Yellow rod brass turnings	8.375
Zincy bronze borings	8.00
Zincy bronze solids	8.00
Fired rifle shells	8.25
Brass pipe	7.50
Old rolled brass	7.00
Admiralty condenser tubes	7.50
Muntz metal condenser tubes	7.00
Plated brass sheet, pipe reflectors	6.50
Manganese bronze solids	7.25*
Manganese bronze solids	6.25*
Manganese bronze borings	6.50*
Manganese bronze borings	5.50*

##### OPA Group 4

Automobile radiators	7.00
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##### OPA Group 5

Refinery brass	5.00*
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\*Price varies with analysis. \*Lead content 0.00 to 0.40 per cent. \*Lead content 0.41 to 1.00 per cent.

#### Other Copper Alloys

Briquetted Cartridge Brass Turnings	8.625
Cartridge Brass Turnings, Loose	7.875
Loose Yellow Brass Trimmings	7.875

### ELECTROPLATING ANODES AND CHEMICALS

#### Anodes

(Cents per lb., f.o.b. shipping point)

Copper: Cast, elliptical, 15 in. and longer	25 1/4
Electrolytic, full size	22 1/2
cut to size	30 1/2
Rolled, oval, straight, 15 in. and longer	23 1/4
Curved	24 1/4
Brass: Cast, 82-20, elliptical, 15 in. and longer	23 1/2
Zinc: Cast, 99.99, 16 in. and over	16 1/2
Nickel: 99% plus, cast	47
Rolled, depolarized	48
Silver: Rolled, 999 fine per Troy (1-9) oz., per oz.	58

### Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

#### Aluminum

##### Plant scrap, segregated

All S-type alloys (except 2S)	8.50
2S solids	8.00
High grade alloys	7.00
Low grade alloys	6.50
Borings and turnings	
High grade alloys	5.50
Low grade alloys	5.00

##### Plant scrap, mixed

All solids	6.00
Borings and turnings	4.00

##### Obsolete scrap

Pure cable	8.00
Old sheet and utensils	7.00
Old castings and forgings	6.50
Pistons, free of struts	6.50
Pistons, with struts	4.50
Old alloy sheet	5.50

For old castings and forgings, pistons, sheets, add 1/4c. lb. for lots 1000 to 19,999 lb.; for other scrap add 1c.; for lots over 19,999 lb. add 1 1/4c. a lb.

### Magnesium

##### Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings	8.00

##### Mixed, contaminated plant scrap

Grade 1 solids	11.00
Grade 1 borings and turnings	7.00
Grade 2 solids	9.00
Grade 2 borings and turnings	5.00

For lots over 1499 lb. add 1c. per lb.

### Zinc

New zinc clippings, trimmings	7.25
Engravers', lithographers' plates	7.25
Old zinc scrap	5.75
Unswaged zinc dross	5.80
Die cast slab	5.80
New die cast scrap	4.95
Radiator grilles, old and new	4.95
Old die cast scrap	4.50

### Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead inc. cable, for f.o.b. point of shipment price.

### Nickel

Ni content 98+%, Cu under 1/4%, 26c. per lb.; 90 to 98% Ni, 26c. per lb. contained Ni.

## March Steel Scrap Stocks Down 2 Per Cent; Consumption Rises 9 Per Cent

• • • Stocks of iron and steel scrap at plants of consumers, suppliers, and producers at the end of March, 1944, approximated 6,027,000 gross tons, a decline of 2 per cent from 6,134,000 tons reported on Feb. 29, 1944, according to a statement released by the Bureau of Mines, United States Department of the Interior. Consumers' stocks on March 31 amounted to 4,853,000 tons, compared with 4,982,000 tons at the end of February, while combined stocks of suppliers and producers were 1,174,000 tons and 1,152,000 tons, on the same dates. The entire decrease in total stocks was due to declines of 116,000 tons and 13,000 tons, respectively, in stocks of purchased and home scrap held by consumers, since inventories of suppliers and producers increased 22,000 tons.

This marked decline in consumers' purchased scrap stocks was caused by the exceptionally high operating rate of the steel industry. Purchased scrap consumption during the month of March was the highest since March, 1943; while the consumption of pig iron during the month was the highest monthly consumption since the inception of these surveys.

The total consumption of ferrous materials (scrap and pig iron) amounted to 9,629,000 gross tons in March, representing an increase of 9 per cent over the 8,875,000 tons consumed in February. This increase was not entirely due to the longer month, since the average daily melt increased approximately 2 per cent over that in February. This increase in the average daily melt was occasioned by

gains of 3, 2 and 1 per cent, respectively, in the average daily use of purchased scrap, home scrap, and pig iron. Although the total consumption of pig iron in March increased approximately 8 per cent over that in February, stocks of this material declined but a fraction of 1 per cent.

**PITTSBURGH**—Even though machine shop turnings and short turnings are said to be easier at some points these items are still bringing the springboard here. Open hearth steel scrap is none too plentiful. A tighter market on the primary scrap grades is expected as steel production remains at record levels.

**BUFFALO**—The district's leading consumer is reported out of the market again for steel turnings after making buys at \$13.50, a new low 25c. below the previous figure. This mill also has just received 15 bargeloads of No. 1 heavy and No. 2 bundles via canal from seaboard, with as much more enroute. Dealers appear to be not too bad off in turnings and are moving all other items readily, including electric furnace material and low phos. Cast iron continues scarce.

**BOSTON**—Mill rejections of turnings are so persistent shippers are about ready to stop handling them. Otherwise the trade has no trouble in selling anything they can get at full ceiling prices. Movement of open hearth material such as bundled skeleton, as well as borings, cast iron, light plate and heavy steel to Pennsylvania consuming points, and of cast iron locally, while not active, is slightly more so. Shipyard steel goes largely to the Bethlehem Steel Co. Little is heard these days about battlefield scrap. Local yards lack sufficient help to handle it.

**CLEVELAND**—After a spurt of activity for several weeks, scrap demand

here has subsided to a low normal level. The flow of open hearth grades is termed stronger, while demand has been slow. Machine shop turnings supply is reported gaining to excess although the demand for short shoveling has caused a tight situation. City buying has slowed to a near halt but some purchasing is still noted from out of city zones. Heavy melting is reported coming out better. Alloy demand is up some and electric demand is improved. Scrap by lake boat is reported coming in. A tighter pig iron supply here has caused heavier demand for blast furnace grades and about steady demand for open hearth, but buying has not reflected any decisive trend.

**CINCINNATI**—District consumers of scrap tend more conservative, since most of them have carried fairly high inventories and appear now to be considering more conservative attitude toward excess supply. Despite the present attitude, however, consumers in the area are taking standard scrap material at the ceiling, but the pressure that has heretofore existed has all but disappeared. Dealers indicate that there is still a hard job obtaining good scrap and so far the supply has been sufficient in quantity to meet current requirements.

**BIRMINGHAM**—Foundry and electric furnace grades are plentiful in this area with no demand. Open hearth grades are relatively scarce, but seem to be taking care of present requirements. Supplies of blast furnace grades are not sufficient to meet demand, and cast grades are moving from this district into Northern and Eastern territory with no takers here.

**PHILADELPHIA**—Although most consumers here are either out of the market or are accepting scrap on a restricted basis, shipments continue heavy because the district's largest consumer is buying heavily. Because of the pig iron shortage, cast is in heavy demand, but the supply remains too short to satisfy all. Alloy contamination of turnings is still a serious problem and the number of rejects is high. Nickel solids have become scarce and all sales now are made at full ceiling price including premiums for nickel content. Other alloys are still impossible to move as is low phos, which is being sold as No. 1 heavy melting.

**CHICAGO**—Larger mill buyers, with comfortable inventories for immediate requirements, continue hesitant in making long term commitments, although heavy melting steel moves readily at ceiling prices. Market for blast furnace grades still is stagnant, despite price concessions which have prevailed for several weeks. Likewise, there is little outlet for many alloy grades despite price concessions.

Summary of Iron and Steel Scrap and Pig Iron Stocks, Gross Tons

	Stocks at End of Month			Consumption During Month		
	Scrap		Pig Iron	Scrap		Pig Iron
	Purchased	Home		Purchased	Home	
Oct. 1943	4,978,000	1,478,000	1,343,000	2,051,000	2,779,000	4,706,000
Nov. 1943	4,896,000	1,495,000	1,332,000	2,008,000	2,575,000	4,465,000
Dec. 1943	4,939,000	1,519,000	1,404,000	1,906,000	2,543,000	4,481,000
Jan. 1944	4,739,000	1,475,000	1,443,000	1,980,000	2,636,000	4,645,000
Feb. 1944	4,694,000	1,440,000	1,480,000	1,880,000	2,534,000	4,461,000
Mar. 1944	4,600,000	1,427,000	1,473,000	2,069,000	2,758,000	4,802,000



# ... SCRAP PRICES

## Railroad Steel and Cast Scrap Price Schedule

BASING POINT	No. 1 and No. 2 Heavy Melting: Wrought Iron and/or Steel Wheels; No. 2 Steel Wheels; Iron and/or Steel Axes; Uncut Bolster and Side Frames	No. 1 Bushings: Steel and Iron Arch Bars; 2 Cast Steel; Flues, Tubes, and Pipes; Lined Iron and Steel; Uncut Structural Wrought Iron and/or Steel; Destroyed Cars and Locomotive Tenders	No. 2 Bushings	No. 1 Turnings	No. 2 Turnings, Drillings, and Borings	Uncut Frogs and Switches	No. 1 Sheet Scrap	No. 2 Sheet Scrap	Scrap Rails, Random Length; Iron Arch Bars, 3 ft. and Under	Retrolling Rails for Retrolling; Uncut Tires; Cut Bolsters and Side Frames; Angles and Splice Bars	Cut Rails, 3 ft. and Under	Cut Rails, 2 ft. and Under	Cut Rails, 18-in. and Under; No. 3 Steel Wheels; Spring Steel; Couples and Knuckles	Cut Tires	Solid Steel Axes for Reforging Use Only. Base Price For Other Uses
Pittsburgh, Can'on, Youngstown, Wheeling, Sharon, Steubenville, Cleveland, Cincinnati, Ashland, Portsmouth, Middletown, Chicago, Philadelphia, Sparrows Point, Wilmington, Buffalo, Kokomo, Duluth, Detroit, St. Louis, Birmingham, Los Angeles, San Francisco, Kansas City, Seattle	\$21.00 20.50 19.75 20.25 19.25 19.00 18.85 18.50 18.00 17.00 15.00	\$20.00 19.50 18.75 19.25 18.25 18.00 17.85 17.50 17.00 16.00 14.00	\$17.50 17.00 16.25 16.75 15.75 15.50 15.35 15.00 14.50 13.50 11.50	\$19.50 19.00 18.25 18.75 17.75 17.50 17.35 17.00 16.50 15.50 13.50	\$15.00 14.50 13.75 14.25 13.25 13.00 12.85 12.50 12.00 11.00 9.00	\$20.50 20.00 19.25 18.75 18.50 18.35 18.00 17.50 16.50 14.50	\$16.00 15.50 14.75 14.25 14.00 13.85 13.50 13.00 12.00 10.00	\$14.00 13.50 12.75 12.25 12.00 11.85 11.50 11.00 10.00 8.00	\$22.00 21.50 20.75 22.25 21.75 21.50 21.35 21.00 20.50 19.50 18.00	\$23.50 23.00 22.25 22.75 22.25 21.50 21.35 21.00 20.50 19.50 17.50	\$24.00 23.50 22.75 23.25 22.50 22.00 21.85 21.50 21.00 20.00 18.00	\$24.25 23.75 23.00 23.50 22.50 22.00 21.85 21.50 21.00 20.25 18.25	\$24.50 24.00 23.25 23.75 22.75 22.50 22.35 22.00 21.50 20.50 18.50	\$25.50 25.00 24.25 24.75 23.75 23.50 23.35 23.00 22.50 21.50 19.50	\$27.00 26.50 25.75 26.25 25.25 25.00 24.85 24.50 24.00 23.00 21.00

**SALES REGULATIONS:** On and after March 15, 1944, no operating railroad not operating in a basing point named may sell or offer for sale iron and steel scrap to a consumer or his broker without obtaining prior written approval from OPA unless prior to that date it has filed with OPA a statement in writing setting forth maximum on-line price for No. 1 Railroad Heavy Melting Steel and describing the method used to calculate this price. The statement shall include: The most favorable basing point selected; the price at such basing point; the location of the scrap accumulation point; the lowest established charge for transporting scrap by rail from such accumulation point to the named basing point; and the foreign line proportion of such lowest established charge.

**MAXIMUM PRICES:** The maximum on-line price of any grade of steel scrap from an operating railroad operating in a basing point shall be the price set for the scrap at the highest priced basing point in which the railroad operates. For an operating railroad not operating in a basing point, the price shall be the price set for the scrap at the most favorable basing point less the foreign line proportion of the lowest charge for transporting scrap by rail from scrap accumulating point of railroad to such basing point. "Scrap accumulation point is that point from which greatest tonnage was shipped in 1943. "Most favorable basing point" that the basing point which will yield the highest maximum on-line price. In no case need the on-line maximum price fall below \$15.00 per gross ton for No. 1 Railroad Heavy Melting Steel. The maximum price of any grade of steel scrap originating from a non-operating railroad shall be the price established for the scrap at the most favorable basing point minus the transportation charges for rail, vessel, or motor vehicle shipment or combinations of these, and for established charges shown in OPA Price Schedule No. 4. Where the non-operating railroad is located in a basing point shown above, the following switching charge deductions will be applicable: Chicago—84c.; Pittsburgh—55c.; Detroit—53c.; Cleveland, Los Angeles, San Francisco, Sharon, and Youngstown—42c.; Seattle—38c.; Buffalo—36c.; Birmingham and Kansas City—32c.; Ashland, Canton, Cincinnati, Duluth, Kokomo, Portsmouth, Steubenville, St. Louis, Wheeling, and Wilmington—28c.; Middletown and Philadelphia—14c.; and Sparrows Point—11c.

**SCRAP PREPARATION:** With the exception of unprepared scrap prepared in-transit, railroad steel scrap prepared by a dealer or moving through a dealer's yard shall be deemed to have lost its railroad origin, and shall be classified and priced as steel scrap other than railroad scrap except in specified grades peculiar to railroad origin (listed in the schedule). For these listed grades the maximum shipping point and delivered prices shall be the same as those established for non-operating railroads for those grades. The maximum shipping point price of any grade of railroad cast iron scrap sold by a dealer shall be the same as that established for the railroad seller. "Unprepared scrap" shall have its customary trade meaning and shall not include such demolition projects as bridges or box cars which must be so priced that the prepared scrap will deliver to the consumer within the maximum delivered price established.

**PREPARATION CHARGES:** If unprepared scrap is purchased from an originating railroad, the consumer may designate a dealer to prepare such scrap on a preparation fee basis. The maximum preparation fee shall be the established differentials between the unprepared scrap and the listed grade for which the scrap is prepared. For example:

\$3.50 per gross ton for prepared No. 1 Railroad Heavy Melting Steel from Structural and/or Wrought Iron and Steel Uncut; or \$2.50 for cutting rails 18-in. and under from Scrap Rails of Random Lengths; or \$4.00 per ton for No. 2 Bundles prepared from No. 1 Sheet Scrap.

For cast, an in-transit preparation fee will be applicable only for preparing Cast Iron No. 3 into Cast Iron No. 1, for which the maximum preparation fee shall be \$3.50 per gross ton. (Previous dealer fee was \$2.50.)

**MAXIMUM PRICE ON PREPARED SCRAP:** The maximum delivered price for railroad scrap prepared in-transit shall be the maximum on-line price for the unprepared scrap, plus the applicable rail transportation charges incurred in moving scrap to dealer's yard, plus the applicable preparation fee, plus transportation charges from the dealer's yard to point of delivery.

### Cast Iron Scrap

Maximum on-line price, per gross ton, for any of the following cast grades will be the price shown at the highest priced zone in which the railroad operates or is located.

	Per Gross Ton		
	Zone A	Zone B	Zone C
Cast Iron, No. 1.....	\$18.00	\$19.00	\$20.00
Cast Iron, No. 2.....	17.00	18.00	19.00
Cast Iron, No. 3.....	14.50	15.50	16.50
Cast Iron, No. 4.....	13.25	14.25	15.25
Cast Iron Brake Shoes.....	13.25	14.25	15.25
Malleable.....	20.00	21.00	22.00
Wheels, No. 1.....	18.00	19.00	20.00

Zone A includes Mont., Idaho, Wyo., Nev., Utah, Ariz., and N. M. Zone B includes N. D., S. D., Neb., Colo., Kan., Okla., Texas, and Fla. Zone C includes all states not named in zones A and B, and includes switching district of Kansas City, Kansas-Missouri.

**CAST IRON GRADE DEFINITIONS:** Cast Iron, No. 1—Cast iron scrap such as columns, pipe, plates and/or castings of miscellaneous nature, but free from stove plate, brake shoes, and/or burnt scrap. Must be cupola size pot over 24 x 30 in. and no pieces to weigh more than 150 lb. Free of foreign material. No. 2—Cast iron scrap in pieces weighing over 150 lb. not more than 500 lb. and free from burnt cast. No. 3—Cast iron scrap in pieces over 500 lb., includes cylinders, driving wheel centers, and/or all other castings. Free from hammer blocks or bases. No. 4—Burnt cast iron scrap such as grate bars, stove parts, and/or miscellaneous burnt scrap. No. 5—Driving and/or car brake shoes of all types except composition filled. Malleable—Malleable parts of automobiles, railroad cars, and locomotives. No. 7—Wheels, No. 1, includes cast iron car and/or locomotive wheels.



# Comparison of Prices . . .

Advances Over Past Week in Heavy Type; Declines in *Italics*.

[Prices Are F.O.B. Major Basing Points]

Flat Rolled Steel: (Cents Per Lb.)	May 23, 1944	May 16, 1944	April 18, 1944	May 25, 1943
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terne Plate: (Dollars Per Base Box)	May 23, 1944	May 16, 1944	April 18, 1944	May 25, 1943
Tin plate, standard cokes	\$5.00	\$5.00	\$5.00	\$5.00
Tin plate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30

Bars and Shapes: (Cents Per Lb.)	May 23, 1944	May 16, 1944	April 18, 1944	May 25, 1943
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40

Wire and Wire Products: (Cents Per Lb.)	May 23, 1944	May 16, 1944	April 18, 1944	May 25, 1943
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55

Rails: (Dollars Per Gross Ton)	May 23, 1944	May 16, 1944	April 18, 1944	May 25, 1943
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00
Light rails	40.00	40.00	40.00	40.00

Semi-Finished Steel: (Dollars Per Gross Ton)	May 23, 1944	May 16, 1944	April 18, 1944	May 25, 1943
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs, rerolling	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

Wire Rods and Skelp: (Cents Per Lb.)	May 23, 1944	May 16, 1944	April 18, 1944	May 25, 1943
Wire rods	2.00	2.00	2.00	2.00
Skelp	1.90	1.90	1.90	1.90

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 143-151.

Pig Iron: (Per Gross Ton)	May 23, 1944	May 16, 1944	April 18, 1944	May 25, 1943
No. 2 fdy., Philadelphia	\$25.84	\$25.84	\$25.84	\$25.89
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	25.11	25.11	25.11	24.68
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.34	25.34	25.34	25.39
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	37.34	37.34	37.34	31.34
Ferromanganese†	135.00	135.00	135.00	135.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.  
‡For carlots at seaboard.

Scrap: (Per Gross Ton)	May 23, 1944	May 16, 1944	April 18, 1944	May 25, 1943
Heavy melt'g steel, P'gh.	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Ch'go	20.00	20.00	20.00	20.00

Coke, Connellsville: (Per Net Ton at Oven)	May 23, 1944	May 16, 1944	April 18, 1944	May 25, 1943
Furnace coke, prompt	\$7.00	\$7.00	\$7.00	\$6.50
Foundry coke, prompt	8.25	8.25	8.25	7.50

Non-Ferrous Metals: (Cents per Lb. to Large Buyers)	May 23, 1944	May 16, 1944	April 18, 1944	May 25, 1943
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

Starting with the issue of April 22, 1943, the weighted finished steel price index was revised for the years 1941, 1942 and 1943. See explanation of the change on page 90 of the April 22, 1943, issue.

## Composite Prices . . .

FINISHED STEEL				PIG IRON				SCRAP STEEL			
May 23, 1944	2.25513c.	a Lb.	23.61	a Gross Ton	19.17	a Gross Ton	19.17	a Gross Ton	19.17	a Gross Ton	19.17
One week ago	2.25513c.	a Lb.	23.61	a Gross Ton	19.17	a Gross Ton	19.17	a Gross Ton	19.17	a Gross Ton	19.17
One month ago	2.25513c.	a Lb.	23.61	a Gross Ton	19.17	a Gross Ton	19.17	a Gross Ton	19.17	a Gross Ton	19.17
One year ago	2.26190c.	a Lb.	23.61	a Gross Ton	19.17	a Gross Ton	19.17	a Gross Ton	19.17	a Gross Ton	19.17
HIGH				LOW				HIGH			
1943	2.25513c.		23.61		19.17		19.17		19.17		19.17
1942	2.26190c.		23.61		19.17		19.17		19.17		19.17
1941	2.43078c.		23.61		19.17		19.17		19.17		19.17
1940	2.30467c.	Jan. 2	2.24107c.	Mar. 20	23.45, Jan. 2	22.00, Jan. 7	19.17, Apr. 10				
1939	2.35367c.	Jan. 3	2.26689c.	May 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9			
1938	2.58414c.	Jan. 4	2.27207c.	Oct. 18	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16			
1937	2.58414c.	Mar. 9	2.32263c.	Jan. 4	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7			
1936	2.32263c.	Dec. 28	2.05200c.	Mar. 10	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.67, June 8			
1935	2.07642c.	Oct. 1	2.06492c.	Jan. 8	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9			
1934	2.15367c.	Apr. 24	1.95757c.	Jan. 2	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29			
1933	1.95578c.	Oct. 3	1.75836c.	May 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25			
1932	1.89196c.	July 5	1.83901c.	Mar. 1	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3			
1931	1.99626c.	Jan. 13	1.86586c.	Dec. 29	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5			
1930	2.25488c.	Jan. 7	1.97319c.	Dec. 9	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29			
1929	2.31773c.	May 28	2.26498c.	Oct. 29	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9			

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

# ... Prices of Finished Iron and Steel

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. Extras apply. Delivered prices do not reflect 3% tax on freight. (1) Mill run sheet, 10c. per lb. under base; primes 25c. above base. (2) Unassorted 8-lb. coating. (3) Widths up to 12-in. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25c. per 100 lb. to fabricators. (8) Also shafting. For quantities of 20,000 to 29,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (12) Boxed. (13) Portland and Seattle price, San Francisco 2.50c. (14) This base price to be used in figuring annealed, bright finish wires, commercial spring wire.

Basing Point ↓ Product													DELIVERED TO			
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	16 Pacific Ports, Cars	Detroit	New York	Phila- delphia	
Hot Rolled Sheets	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢	
Cold Rolled Sheets <sup>1</sup>	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢	
Galvanized Sheets (24 gage)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢	
Enameling Sheets (20 gage)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢	
Long Terns <sup>2</sup>	3.80¢	3.80¢	3.80¢									4.55¢		4.16¢	4.12¢	
Hot Rolled Strip <sup>2</sup>	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢		
Cold Rolled Strip <sup>4</sup>	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢	3.16¢		
Cooperage Stock Strip	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢		
Commodity C-R Strip	2.95¢	3.05¢		2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢	3.31¢		
Coke Tin Plate, Base Box	\$5.00	\$5.00	\$5.00						\$5.10					5.36¢	5.32¢	
.50 } Electro Tin Plate, Box .75 }	\$4.50	\$4.50	\$4.50						\$4.60							
	\$4.65		\$4.65						\$4.75							
Black Plate (29 gage) <sup>5</sup>	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ <sup>12</sup>			3.37¢	
Mfg. Terns, Special Box	\$4.30	\$4.30	\$4.30						\$4.40							
Carbon Steel Bars	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢	
Rail Steel Bars <sup>6</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢				
Reinforcing (Billet) Bars <sup>7</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢ <sup>13</sup>	2.25¢	2.39¢		
Reinforcing (Rail) Bars <sup>7</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢ <sup>13</sup>	2.25¢		2.47¢	
Cold Finished Bars <sup>8</sup>	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢		(Detroit = 2.70¢)			(Toledo = 2.80¢)		2.99¢	2.97¢		
Alloy Bars, Hot Rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massillon, Canton = 2.70¢)					2.80¢			
Alloy Bars, Cold Drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢			
Carbon Steel Plates	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	(Coatesville and Claymont = 2.10¢)	2.10¢	2.35¢		2.45¢	2.65¢	2.32¢	2.29¢	2.15¢
Floor Plates	3.35¢	3.35¢										3.70¢	4.00¢	3.71¢	3.67¢	
Alloy Plates	3.50¢	3.50¢				(Coatesville = 3.50¢)						3.95¢	4.15¢	3.70¢	3.59¢	
Structural Shapes	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢	
SPRING STEEL, C-R 0.26 to 0.50 Carbon	2.80¢			2.80¢				(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢				(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢				(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢				(Worcester = 8.55¢)								
Bright Wire <sup>14</sup>	2.60¢	2.60¢		2.60¢	2.60¢			(Worcester = 2.70¢)		(Duluth = 2.65¢)		3.10¢			2.92¢	
Galvanized Wire																
	Add proper size extra and galvanizing extra to Bright Wire base.															
Spring (High Carbon)	3.20¢	3.20¢		3.20¢				(Worcester = 3.30¢)				3.70¢			3.52¢	
Steel Sheet Piling	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢	

EXCEPTIONS TO PRICE SCHED. NO. 6  
Slabs—Andrews Steel Co. \$41 basing pts.;  
Wheeling Steel Corp. \$34 Portsmouth,  
Ohio; Empire Sheet & Tin Plate Corp.  
\$41; Phoenix Iron Co. (rerolling) \$41.  
(forging) \$47; Granite City Steel Co.  
\$47.50.

Blooms—Phoenix Iron Co. (rerolling) \$41.  
(forging) \$47.  
Sheet Bar—Empire Sheet & Tin Plate Co.  
\$39 mill; Wheeling Steel Corp. \$38 Port-  
smouth, Ohio.

Billets, Forging—Andrews Steel Co. \$50  
onasing pts.; Follansbee Steel Corp. \$49.50  
Toronto; Phoenix Iron Co. \$47.00 mill.

Billets, Rerolling—Continental Steel Corp.  
may charge Acme Steel in Chicago switch-  
ing area \$34 plus freight from Kokomo.  
Ind.; Northwestern Steel & Wire Co.  
(Lend-Lease) \$41 mill; Wheeling Steel  
Corp. (small) \$36 Portsmouth, Ohio;  
(blooming mill sizes) applicable base,  
f.o.b. Portsmouth, Ohio; Stanley Works  
may sell Washburn Wire Co. under allo-  
cation at \$39 Bridgeport, Conn.; Key-  
stone Steel & Wire Co. may sell Acme  
Steel Co. at Chicago base, f.o.b. Peoria;  
Phoenix Iron Co. \$41 mill; Continental  
Steel Corp. (1½ x 1½) \$39.50, (2 x 2)  
\$40.60 Kokomo, Ind. (these prices include  
\$1 size extra); Keystone Steel & Wire  
Co. \$36.40 Peoria; Connors Steel Co.  
\$50.69 Birmingham; Ford Motor Co. \$34  
Dearborn, Mich.

Structural Shapes—Phoenix Iron Co. \$2.35  
basing pts., (export) \$2.50 Phoenixville;  
Knoxville Iron Co. \$2.30 basing pts.

Bar Size Shapes—(Angles) W. Ames &  
Co., 10 tons or over, \$3.10 mill.

Rails—Sweet Steel Co. (rail steel) \$50  
mill; West Virginia Rail Co. (lightweight)  
in allocation based Huntington, W. Va.;  
Colorado Fuel & Iron Corp. \$45 Pueblo.

Hot Rolled Plate—Granite City Steel Co.  
\$2.65 mill; Knoxville Iron Co. \$2.25 bas-  
ing pts.; Kaiser Co. \$3.20 Pacific Ports;  
Central Iron & Steel Co. \$2.50 basing  
points; Granite City Steel Co. \$2.35  
Granite City.

Merchant Bars—W. Ames & Co., 10 tons  
and over, \$2.85 mill; Eckels-Nye Steel  
Corp., \$2.50 basing pts. (rail steel) \$2.40;  
Phoenix Iron Co. \$2.40 basing pts.; Sweet  
Steel Co. (rail steel) \$2.35 mill; Joslyn  
Mfg. & Supply Co. \$2.35 Chicago; Calumet  
Steel Div., Borg Warner Corp. (8 in. mill  
bars) \$2.35 Chicago; Knoxville Iron Co.  
\$2.30 basing pts. LaSalle Steel Co., sales  
to LaSalle Steel granted Chicago base,  
f.o.b. Madison, Ill.

Reinforcing Bars—W. Ames & Co., 10  
tons and over, \$2.85 mill; Sweet Steel Co.  
(rail steel) \$2.35 mill; Columbia Steel Co.  
\$2.50 Pacific Ports.

Cold Finished Bars—Keystone Drawn  
Steel Co. on allocation, Pittsburgh c.f.  
base plus c/l freight on hot rolled bars  
Pittsburgh to Spring City, Pa.; New Eng-  
land Drawn Steel Co. on allocation out-  
side New England, Buffalo c.f. base plus  
c/l freight Buffalo to Massfield, Mass.,  
f.o.b. Massfield; Empire Finished Steel  
Corp. on allocation outside New England.

Buffalo c.f. base plus c/l freight Buffalo  
to plants f.o.b. plant; Compressed Steel  
Shafting Co. on allocation outside New  
England, Buffalo base plus c/l freight  
Buffalo to Readville, Mass. f.o.b. Read-  
ville; Medart Co. in certain areas, Chi-  
cago c.f. base plus c/l freight Chicago to  
St. Louis, f.o.b. St. Louis.

Alloy Bars—Texas Steel Co. for delivery  
except Texas and Okla. Chicago base,  
f.o.b. Fort Worth, Tex.; Connors Steel Co.  
shipped outside Ala., Mississippi, Louisi-  
ana, Georgia, Florida, Tenn., Pittsburgh  
base, f.o.b. Birmingham.

Hot Rolled Strip—Joslyn Mfg. & Supply  
Co. \$2.30 Chicago; Knoxville Iron Co.  
\$2.25 basing pts.

Hot Rolled Sheets—Andrews Steel Co.,  
Middletown base on shipments to Detroit  
or area; Parkersburg Iron & Steel Co.,  
\$2.25 Parkersburg.

Galvanized Sheets—Andrews Steel Co.,  
\$3.75 basing pts.; Parkersburg Iron &  
Steel Co. \$3.85 Parkersburg; Apollo Steel  
Co. \$3.75 basing pts.; Continental Steel  
Co., Middletown base on Kokomo, Ind.,  
product; Superior Sheet Steel Co., Pitts-  
burgh base except for Lend-Lease.

Pipe and Tubing—South Chester Tube Co.  
when priced at Pittsburgh, freight to Gulf  
Coast and Pacific Ports may be charged  
from Chester, Pa., also to points lying  
west of Harrisburg, Pa.

Black Sheets—Empire Sheet and Tinplate  
Co., maximum base price mill is \$2.45 per  
100 lb., with differentials, transportation  
charges, etc., provided in RPS. No. 6.



# PRICES

## WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendments to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates 1/4 in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 8617-20	Hot Rolled, NE 9442-45 Ann.	Cold Drawn, NE 8617-20	Cold Drawn, NE 9442-45 Ann.
**Philadelphia	3.518	4.872 <sup>a</sup>	5.018 <sup>a</sup>	3.922	4.772	3.605	3.666	3.822	4.072	5.966	7.066	7.272	8.322
New York	3.590	4.613 <sup>a</sup>	5.010	3.974 <sup>a</sup>	4.772	3.768	3.758	3.853	4.103	6.008	7.108	7.303	8.353
Boston	3.744	4.744 <sup>a</sup>	5.224 <sup>a</sup>	4.106	4.715	3.912	3.912	4.044	4.144	6.162	7.262	7.344	8.394
Baltimore	3.394	4.852	4.894	3.902	4.752	3.594	3.759	3.802	4.082				
Norfolk	3.771	4.965	5.371	4.165	4.865	3.971	4.002	4.065	4.165				
Chicago	3.25	4.20	5.231	3.60	4.651 <sup>7</sup>	3.55	3.55	3.50	3.75	5.75	6.85	6.85	7.90
Milwaukee	3.387	4.337 <sup>2</sup>	5.272 <sup>4</sup>	3.737	4.787 <sup>17</sup>	3.687	3.687	3.637	3.887	5.987	7.087	7.087	8.137
Cleveland	3.35	4.40	4.877 <sup>4</sup>	3.60	4.45	3.40	3.588	3.35	3.75	5.956	7.056	6.85	7.90
Buffalo	3.35	4.40	4.75 <sup>4</sup>	3.819	4.669	3.63	3.40	3.35	3.75	5.75	6.85	6.85	7.90
Detroit	3.45	4.50	5.00 <sup>4</sup>	3.70	4.659 <sup>17</sup>	3.609	3.661	3.45	3.80	6.08	7.18	7.159	8.209
Cincinnati	3.425	4.475 <sup>3</sup>	4.825 <sup>5</sup>	3.675	4.711	3.611	3.691	3.611	4.011				
St. Louis	3.397	4.347 <sup>3</sup>	5.172 <sup>4</sup>	3.747	4.931 <sup>17</sup>	3.697	3.697	3.647	4.031	6.131	7.231	7.231	8.281
Pittsburgh	3.35	4.40	4.75	3.80	4.45	3.40	3.40	3.35	3.75	5.75	6.85	6.85	7.90
St. Paul	3.51	4.46	5.257 <sup>4</sup>	3.86	4.351 <sup>7</sup>	3.813	3.813	3.761 <sup>3</sup>	4.361	6.09	7.19	7.561	8.711
Omaha	3.865	5.443	5.608 <sup>4</sup>	4.215		4.165	4.165	4.115	4.43				
Indianapolis	3.58	5.58	4.568	4.918	3.768	4.78	3.63	3.58	3.98	6.08	7.18	7.18	8.23
Birmingham	3.45	4.75	3.70			3.55	3.55	3.50	4.43				
Memphis	3.965 <sup>7</sup>	4.66	3.265	4.215		4.065	4.065	4.015	4.33				
New Orleans	4.058 <sup>a</sup>	4.95	5.358	4.308		4.158	4.158 <sup>a</sup>	4.108 <sup>a</sup>	4.629				
Houston	3.763	5.573	6.313 <sup>1</sup>	4.313		4.25	4.25	3.75	6.373 <sup>3</sup>	7.223	8.323	8.323	9.373
Los Angeles	5.00	7.20 <sup>3</sup>	6.10 <sup>4</sup>	4.95	5.613 <sup>15</sup>	4.95	4.65	4.40	5.583	8.304	9.404	9.404	10.454
San Francisco	4.551 <sup>4</sup>	7.30 <sup>4</sup>	6.35 <sup>4</sup>	4.501 <sup>4</sup>	7.333 <sup>17</sup>	4.651 <sup>4</sup>	4.351 <sup>4</sup>	4.151 <sup>4</sup>	5.333	8.304	9.404	9.404	10.454
Seattle	4.651 <sup>2</sup>	7.05 <sup>4</sup>	5.95 <sup>4</sup>	4.251 <sup>2</sup>		4.751 <sup>2</sup>	4.451 <sup>2</sup>	4.351 <sup>2</sup>	5.783		9.404		
Portland	4.651 <sup>11</sup>	6.60 <sup>4</sup>	5.75 <sup>4</sup>	4.751 <sup>11</sup>		4.751 <sup>11</sup>	4.451 <sup>11</sup>	4.451 <sup>11</sup>	5.533	8.304	9.404	8.304	9.404
Salt Lake City	4.531 <sup>7</sup>		6.171 <sup>8</sup>	5.531 <sup>7</sup>		4.981 <sup>7</sup>	4.981 <sup>7</sup>	4.881 <sup>7</sup>	5.90				

## NATIONAL EMERGENCY (N. E.) STEELS (Hot Rolled Mill Extras for Alloy Content)

Designation	CHEMICAL COMPOSITION LIMITS, PER CENT							Basic Open-Hearth		Electric Furnace		
	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Silicon	Chromium	Nickel	Molybdenum	Bars and Bar-Strip	Billets, Blooms and Slabs	Bars and Bar-Strip	Billets, Blooms and Slabs
NE 1330	.28/ .33	1.60/1.90	.040	.040	.20/ .35				.10c	\$2.00		
NE 1335	.33/ .38	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1340	.38/ .43	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1345	.43/ .48	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1350	.48/ .53	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 8613	.12/ .17	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25c	\$25.00
NE 8615	.13/ .18	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8617	.15/ .20	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8620	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8630	.28/ .33	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8635	.33/ .38	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8637	.35/ .40	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8640	.38/ .43	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8642	.40/ .45	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8645	.43/ .48	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8650	.48/ .53	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8720	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.20/ .30	.80	16.00	1.30	26.00
NE 9255	.50/ .60	.70/ .95	.040	.040	1.80/2.20				.40	8.00		
NE 9260	.55/ .65	.70/1.00	.040	.040	1.80/2.20				.40	8.00		
NE 9261	.55/ .65	.70/1.00	.040	.040	1.80/2.20	.10/ .25			.65	13.00		
NE 9262	.55/ .65	.70/1.00	.040	.040	1.80/2.20	.25/ .40			.65	13.00		
NE 9415	.13/ .18	.80/1.10	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9420	.18/ .23	.80/1.10	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9422	.20/ .25	.80/1.10	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9425	.23/ .28	.80/1.10	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9430	.28/ .33	.90/1.20	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9435	.33/ .38	.90/1.20	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9437	.35/ .40	.90/1.20	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9449	.38/ .43	.90/1.20	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9442	.40/ .45	1.00/1.30	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.80	16.00	1.30	26.00
NE 9445	.43/ .48	1.00/1.30	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.80	16.00	1.30	26.00
NE 9450	.48/ .53	1.20/1.50	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.80	16.00	1.30	26.00
NE 9537*	.35/ .40	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9540*	.38/ .43	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9542*	.40/ .45	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9545*	.43/ .48	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9550*	.48/ .53	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00

<sup>a</sup>Recommended for large sections only. Note: The extras shown are in addition to a base price of 2.70c. per 100 lb., on finished products and \$54 per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished. When acid open-hearth is specified and acceptable acid to basic open hearth alloy differential 0.25c. per lb. for bars and bar strip, \$5.00 per gross ton for billets, blooms and slabs. The ranges shown above are restricted to sizes 100 sq. in. or less or equivalent cross sectional area 18 in. wide or under with a max. individual piece weight of 7000 lb.

## Base Quantities

Standard unless otherwise keyed on prices.

**HOT ROLLED:** Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

**COLD ROLLED:** Sheets, 400 to 1499 lb.; strip, extras on all quantities; bars, 1500 lb. base; NE alloy bars, 1000 to 39,999 lb.

**EXCEPTIONS:** (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 1999 lb. (7) 400 to 1999 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb. and over. (15) 1000 lb. and over. (16) 1500 lb. and over. (17) 2000 lb. and over. (18) 3500 lb. and over.

(\*) Philadelphia: Galvanized sheets, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

\*Add 0.271c. for sizes not rolled in Birmingham.

\*\*City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

## LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports\*)

Per Gross Ton  
Old range, bessemer, 51.50 ..... \$4.75  
Old range, non-bessemer, 51.50 ..... 4.60  
Mesaba, bessemer, 51.50 ..... 4.60  
Mesaba, non-bessemer, 51.50 ..... 4.45  
High phosphorus, 51.50 ..... 4.35

\*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

## FLUORSPAR

Maximum price f.o.b. consumer's plant, \$30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

## Exception

When the WPB Steel Division certifies in writing the consumer's need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Base price per short ton  
70% or more ..... \$33.00  
65% but less than 70% ..... 32.00  
60% but less than 65% ..... 31.00  
Less than 60% ..... 30.00



## PRICES

### SEMI-FINISHED STEEL

#### Ingots, Carbon, Rerolling

Base per gross ton, f.o.b. mill.... \$31.00  
*Exceptions:* Phoenix Iron Co. may charge \$38.75; Kaiser Co., \$43.00 f.o.b. Pacific Coast Ports; Empire Sheet & Tinplate Co., \$34.25.

#### Ingots, Carbon, Forging

Base per gross ton, f.o.b. Birmingham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngstown.... \$36.00  
*Exceptions:* Phoenix Iron Co. may charge \$43.00; Empire Sheet & Tinplate Co., \$39.25, f.o.b. Mansfield, Ohio; West Coast producers, \$48.00, f.o.b. Pacific Coast Ports.

#### Ingots, Alloy

Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Coatesville, Chicago, Massillon, Pittsburgh.... \$45.00  
*Exceptions:* C/L delivered Detroit add \$2.00; delivered East Michigan add \$3.00. Connors Steel Co. may charge \$45.00 f.o.b. Birmingham.

#### Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2.00 higher; delivered E. Michigan, \$3 higher; f.o.b. Duluth, billets only, \$2.00 higher; billets f.o.b. Pacific ports are \$12 higher. Delivered prices do not reflect three per cent tax on freight rates.

#### Per Gross Ton

Rerolling..... \$34.00  
 Forging quality..... 40.00  
 For exceptions on semi-finished steel see the footnote on the page of finished steel prices.

#### Alloy Billets, Blooms, Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton..... 64.00  
 Price delivered Detroit \$2.00 higher; E. Michigan \$3.00 higher.

#### Shell Steel

#### Per Gross Ton

3 in. to 12 in..... \$52.00  
 12 in. to 18 in..... 54.00  
 18 in. and over..... 56.00  
 Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham. Prices delivered Detroit are \$2.00 higher; E. Michigan, \$3 higher.  
 Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

#### Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point.

#### Per Gross Ton

Open hearth or bessemer..... \$34.00

#### Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

#### Per Lb

Grooved, universal and sheared..... 1.90c

#### Wire Rods

(No. 5 to 9/32 in.)

#### Per Lb

Pittsburgh, Chicago, Cleveland..... 2.00c  
 Worcester, Mass..... 2.10c  
 Birmingham..... 2.00c  
 San Francisco..... 2.50c  
 Galveston..... 2.25c  
 9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

### TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

#### Base per lb.

High speed..... 67c  
 Straight molybdenum..... 54c  
 Tungsten-molybdenum..... 57 1/2c  
 High-carbon-chromium..... 43c  
 Oil hardening..... 24c  
 Special carbon..... 22c  
 Extra carbon..... 18c  
 Regular carbon..... 14c

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 3c. higher.



"VAN NORMAN"  
 Milling Machine  
 ... Bijur-Lubricated

## protection BUILT-IN...

● Examine any improved new machine, devised to reduce the over-all completion time of work in progress—and the chances are you will find it automatically lubricated. BIJUR built-in lubrication means built-in protection... for maintained high speeds, uninterrupted long runs, unimpaired machine efficiency.

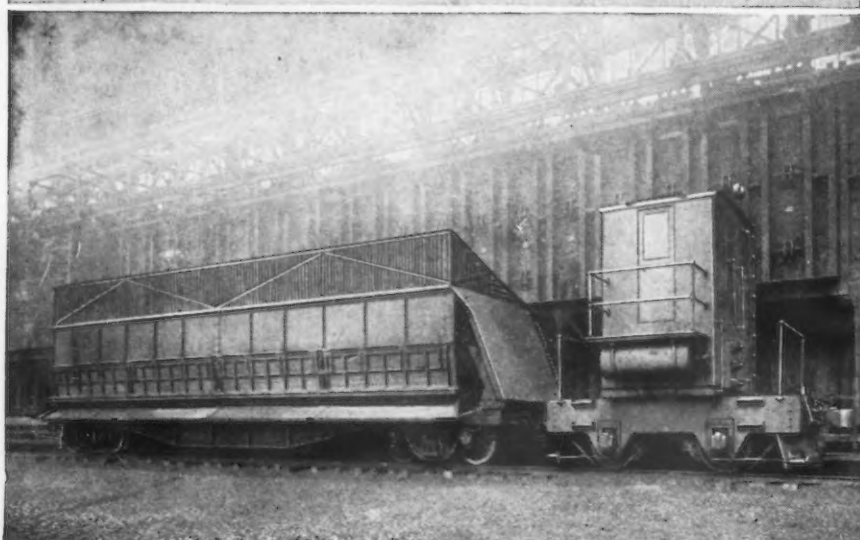
Cuts maintenance costs, too!

Bijur Lubricating Corporation, Long Island City, N. Y.

**BIJUR**  
 AUTOMATIC *Metered* LUBRICATION

1614

## COKE OVEN EQUIPMENT



## QUENCHING CARS AND LOCOMOTIVES

All Atlas Coke Oven Equipment is of heavy-duty construction permitting the peak operating conditions required in today's stepped-up production schedules. As a result of years of experience, Atlas is able to design and build equipment, to meet the requirements of each particular coke plant. Detailed information available on request.

### Other ATLAS Products

Ore Transfer Cars	Locomotives for
•	Switching and Interplant
Scale Charging Cars	Haulage
•	•
Electrically Operated Cars for	Turntables
Every Haulage Purpose	

**The ATLAS CAR & MFG. CO.**

ENGINEERS

MANUFACTURERS

1100 IVANHOE RD.

CLEVELAND, OHIO, U. S. A.

## PRICES

### WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe)  
Base Price—\$2.00 per Net Ton

#### Steel (Butt Weld)

	Black	Galv.
1/2 in. ....	63 1/2	51
3/4 in. ....	66 1/2	55
1 to 3 in. ....	68 1/2	57 1/2

#### Wrought Iron (Butt Weld)

1/2 in. ....	24	3 1/2
3/4 in. ....	30	10
1 and 1 1/4 in. ....	34	16
1 1/2 in. ....	38	18 1/2
2 in. ....	37 1/2	18

#### Steel (Lap Weld)

2 in. ....	61	49 1/2
2 1/2 and 3 in. ....	64	52 1/2
3 1/2 to 6 in. ....	66	54 1/2

#### Wrought Iron (Lap Weld)

2 in. ....	30 1/2	12
2 1/2 to 3 1/2 in. ....	31 1/2	14 1/2
4 in. ....	33 1/2	18
4 1/2 to 8 in. ....	32 1/2	17

#### Steel (Butt, extra strong, plain ends)

1/2 in. ....	61 1/2	50 1/2
3/4 in. ....	65 1/2	54 1/2
1 to 3 in. ....	67	57

#### Wrought Iron (Same as Above)

1/2 in. ....	25	6
3/4 in. ....	31	12
1 to 2 in. ....	38	19 1/2

#### Steel (Lap, extra strong, plain ends)

2 in. ....	59	48 1/2
2 1/2 and 3 in. ....	63	52 1/2
3 1/2 to 6 in. ....	66 1/2	56

#### Wrought Iron (Same as Above)

2 in. ....	33 1/2	15 1/2
2 1/2 to 4 in. ....	39	22 1/2
4 1/2 to 6 in. ....	37 1/2	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld.

### CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago....	\$54.80
6-in. and larger, del'd New York....	52.20
6-in. and larger, Birmingham ....	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles .....	69.40
6-in. and larger f.o.b. cars, Seattle. ....	71.20
Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are \$45 at Birmingham and \$53.80 delivered Chicago, \$59.40 at San Francisco and Los Angeles, and \$70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.	

### BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes, Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

	Seamless	Lap
	Cold	Hot
	Drawn	Rolled
2 in. o.d. 13 B.W.G. ....	15.03	13.04
2 1/2 in. o.d. 12 B.W.G. ....	20.21	17.54
3 in. o.d. 12 B.W.G. ....	22.48	19.50
3 1/2 in. o.d. 11 B.W.G. ....	23.37	24.62
4 in. o.d. 10 B.W.G. ....	35.20	30.54

(Extras for less carload quantities)

40,000 lb. or ft., and over.....	Base
30,000 lb. or ft. to 39,999 lb. or ft. ....	5%
20,000 lb. or ft. to 29,999 lb. or ft. ....	10%
10,000 lb. or ft. to 19,999 lb. or ft. ....	20%
5,000 lb. or ft. to 9,999 lb. or ft. ....	30%
2,000 lb. or ft. to 4,999 lb. or ft. ....	45%
Under 2,000 lb. or ft. ....	65%

## PRICES

### WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points	Pacific Coast Basing Points
	Named	Pointst
	Base per Keg	
Standard wire nails.....	\$2.55	\$3.05
Coated nails .....	2.55	3.05
Cut nails, carloads ....	3.85	.....
	Base per 100 Lb.	
Annealed fence wire ....	\$3.05	\$3.55
Annealed galv. fence wire	3.40	3.90
	Base Column	
Woven wire fence* ....	\$0.67	\$0.85
Fence posts, carloads ..	.69	.86
Single loop bale ties ...	.59	.84
Galvanized barbed wire**	.70	.80
Twisted barbless wire ...	.70	.....

\*15 1/2 gage and heavier. \*\*On 80-rod spools in carload quantities.  
†Prices subject to switching or transportation charges.

### BOLTS, NUTS, RIVETS, SET SCREWS

#### Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

#### Machine and Carriage Bolts:

	Base discount less case lots	Per Cent Off List
1/2 in. & smaller x 6 in. & shorter...	65 1/2	
3/16 to 1 in. x 6 in. & shorter.....	63 1/2	
1/2 to 1 in. x 6 in. & shorter .....	61	
1 1/2 in. and larger, all lengths .....	59	
All diameters over 6 in. long.....	59	
Lag, all sizes .....	62	
Plow bolts .....	65	

#### Nuts, Cold Punched or Hot Pressed:

	(Hexagon or Square)
1/2 in. and smaller .....	62
3/16 to 1 in. inclusive .....	59
1 1/2 to 1 1/2 in. inclusive.....	57
1 1/2 in. and larger .....	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

#### Semi-Fin. Hexagon Nuts U.S.S. S.A.E.

	Base discount less keg lots
7/16 in. and smaller .....	64
1/2 in. and smaller .....	62
1/2 in. through 1 in. ....	60
3/16 in. to 1 in. ....	59
1 1/2 in. through 1 1/2 in. ....	57
1 1/2 in. and larger .....	56

In full keg lots, 10 per cent additional discount.

#### Stove Bolts

	Consumer
Packages, nuts loose .....	71 and 10
In packages, with nuts attached .....	71
In bulk .....	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland Chicago, New York on lots of 200 lb. or over.

#### Large Rivets

	(1/2 in. and larger)	Base per 100 lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham .....		\$3.75

#### Small Rivets

	(7/16 in. and smaller)	Per Cent Off List
F.o.b. Pittsburgh, Cleveland Chicago, Birmingham .....		65 and 5

#### Cap and Set Screws

	Consumer
	Per Cent Off List
Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in. ....	64
Upset set screws, cup and oval points	71
Milled studs .....	46
Flat head cap screws, listed sizes .....	36
Fillister head cap, listed sizes .....	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

### ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C. ....	\$6.00	\$12.00
15-lb. coating I.C. ....	7.00	14.00
20-lb. coating I.C. ....	7.50	15.00



Forming,  
Welding,  
Fabricating—

3000 lb. Electro Processing Oven of 1/4" steel plate (50" long x 36" inside diameter) shown with rock wool jacket removed... fabricated by Brandt for a large cork board plant.

## Call BRANDT of Baltimore

for Precision in Heavy Plate and Sheet Steel Work

Here is an 8 1/2 acre plant... with the most modern equipment for shearing, rolling, forming, welding and completely fabricating ferrous, non-ferrous and alloy metals to your specifications... from the lightest gauge up to and including 1 1/4" mild steel or 3/4" armor plate. Extensive war contracts necessarily limit our present acceptance of new business for immediate delivery. For information, address: Charles T. Brandt, Inc., Baltimore-30, Maryland.



BRANDT of Baltimore—Craftsmen in Metal Since 1890

# Fast Tough

**Heavy feed at high speed!**

Heavy feed at high speed spells doom to the ordinary hack saw blade; down-time for your machine, extra expense in money, man hours, and production. The MARVEL Hack Saw Blade, because it is positively unbreakable under these conditions, should be "a must" tool in every efficiently operated shop. A tough alloy steel back is electrically welded to high speed steel teeth, producing a blade that can be pulled to almost unlimited tension; can withstand extra heavy feeds and the heat and abrasion of high speed heavy duty sawing.

The same exclusive unbreakable feature of MARVEL Hole Saws, giving these saws the ability to stand up under abuse. MARVEL Hole Saws cut holes from 3/8" to 4 1/2" diameter in stock up to 1 1/2" thick. Usable in portable drill, drill press, or lathe tail stock.

**Complete Range of Metal Sawing Machines**  
Being the largest exclusive manufacturer of metal sawing machines and blades, both hack saw and band saw type, we have the correct answer to your cut-off problems. Each MARVEL model has a distinct application, so write us and we will send our catalog, price, and recommendation for the saw to fill your requirements most efficiently. MARVEL sawing engineers are also available to discuss and analyze your cut-off work. (Without obligation of course.)

**ARMSTRONG-BLUM MFG. CO.**  
5700 W. Bloomingdale Ave., Chicago 39, Illinois, U.S.A.



# PRICES

## PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima. Delivered prices do not reflect 3 per cent tax on freight rates.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston	\$25.50	\$25.00	\$26.50	\$26.00		
Brooklyn	27.50	27.00		28.00		
Jersey City	26.53	26.03	27.53	27.03		
Philadelphia (4)	25.84	25.34	26.84	26.34	\$30.74	
Bethlehem, Pa.	25.00	24.50	26.00	25.50		
Everett, Mass.	25.00	24.50	26.00	25.50		
Swedeland, Pa.	25.00	24.50	26.00	25.50		
Steelton, Pa.		24.50			29.50	
Birdsboro, Pa. (3)	25.00	24.50	26.00	25.50	29.50	
Sparrows Point, Md.	25.00	24.50				
Erie, Pa.	24.00	23.50	25.00	24.50		
Neville Island, Pa.	24.00	23.50	24.50	24.00		
Sharpville, Pa. (1)	24.00	23.50	24.50	24.00		
Buffalo	24.00	23.50	25.00	24.50	29.50	
Cincinnati, Ohio	25.11	24.61		25.11		
Canton, Ohio	25.39	24.89	25.89	25.39	32.69	
Mansfield, Ohio	25.94	25.44	26.44	25.94	32.66	
St. Louis	24.50	24.50				
Chicago	24.00	23.50	24.50	24.00	35.46	\$37.34
Granite City, Ill.	24.00	23.50	24.50	24.00		
Cleveland	24.00	23.50	24.50	24.00	32.42	
Hamilton, Ohio	24.00	23.50		24.00		
Toledo	24.00	23.50	24.50	24.00		
Youngstown	24.00	23.50	24.50	24.00	32.42	
Detroit	24.00	23.50	24.50	24.00		
Lake Superior fc.						34.00
Lyles, Tenn. fc. (2)						33.00
St. Paul	26.63	26.13	27.13	26.63	39.80	
Duluth	24.50	24.00	25.00	24.50		
Birmingham	20.38	19.00	25.00			
Los Angeles	26.95					
San Francisco	26.95					
Seattle	26.95					
Provo, Utah	22.00	21.50				
Montreal	27.50	27.50		28.00		
Toronto	25.50	25.50		26.00		

GRAY FORGE IRON: Valley or Pittsburgh furnace .....\$25.50

(1) Pittsburgh Coke & Iron Co. (Sharpville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable. Struthers Iron and Steel Co. may add another \$1.00 per gross ton for iron from Struthers, Ohio, plant.

(2) Price shown is for low-phosphorous iron; high phosphorous sells for \$28.50 at the furnace.

(3) E. & G. Brooke Co. Birdsboro, Pa., permitted to charge \$1.00 per ton extra.

(4) Pittsburgh Ferromanganese Co. (Chester furnace only) may charge \$2.25 a ton over maximum basing point prices.

Basing point prices are subject to switching charges; Silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 to 2.25 per cent); Phosphorus differentials, a reduction of 38c. per ton for phosphorus content of 0.70 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, \$2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and \$1 per ton extra for each additional 0.25 per cent nickel.

## METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, c. per lb., ton lots.

Copper, electrolytic, 150 and 200 mesh	21 1/2 to 23 1/2 c.
Copper, reduced, 150 and 200 mesh	20 1/2 to 25 1/2 c.
Iron, commercial, 100 and 200 mesh, 96 + % Fe	13 1/2 to 15 c.
Iron, crushed, 200 mesh and finer, 90 + % Fe	4 c.
Iron, hydrogen reduced, 300 mesh and finer, 98 1/2 + % Fe	63 c.
Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe	30 to 33 c.
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	42 c.
Iron, carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90 c.
Aluminum, 100 and 200 mesh	23 to 27 c.
Antimony, 100 mesh	20.6 c.
Cadmium, 100 mesh	\$1
Chromium, 150 mesh	\$1.03
Lead, 100, 200 & 300 mesh, 11 1/2 to 12 1/2 c.	
Manganese, 150 mesh	51 c.
Nickel, 150 mesh	51 1/2 c.
Solder powder, 100 mesh, 8 1/2 c. plus metal	
Tin, 100 mesh	58 3/4 c.
Tungsten metal powder, 98% - 99%, any quantity, per lb.	\$2.60
Molybdenum power, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb.	\$2.60
Under 100 lb.	\$3.00

\*Freight allowed east of Mississippi.

## COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	\$7.00*
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	8.25
Foundry, By-Product	
Chicago, del'd	13.35
Chicago, f.o.b.	12.60
New England, del'd	14.25
Kearny, N. J., f.o.b.	12.65
Philadelphia, del'd	12.88
Buffalo, del'd	13.00
Portsmouth, Ohio, f.o.b.	11.10
Painesville, Ohio, f.o.b.	11.75
Erie, del'd	12.75
Cleveland, del'd	12.80
Cincinnati, del'd	12.85
St. Louis, del'd	13.85
Birmingham, del'd	10.50

\*Hand drawn ovens using trucked coal permitted to charge \$7.75 per ton plus transportation charges. \*\*Mo., Ala., and Tenn. producers—\$13.35.

## It's the Encore that Counts! CLARK Electric FORK TRUCKS ARE BACK...AND AVAILABLE



Concentrated effort on production of gas powered fork trucks for our Armed Forces curtailed the manufacture of Clark Electric Fork Trucks for a short time.

Increased productive capacity enables us to again serve the needs of Industry for dependable and proven electric fork trucks.

## CLARK ENGINEERED and CLARK BUILT

If you need an electric fork truck NOW, phone, wire or write.



**CLARK TRUCTRATOR**  
DIVISION OF CLARK EQUIPMENT COMPANY  
BATTLE CREEK, MICHIGAN, U.S.A.

## PRICES

### REFRACTORIES (F.o.b. Works)

Fire Clay Brick		Per 1000
Super-duty brick, St. Louis	.....	\$64.60
First quality, Pa., Md., Ky., Mo., Ill.	.....	51.30
First quality, New Jersey	.....	56.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	.....	46.55
Second quality, New Jersey	.....	51.00
No. 1, Ohio	.....	43.00
Ground fire clay, net ton	.....	7.60

Silica Brick		
Pennsylvania and Birmingham	.....	\$51.30
Chicago District	.....	58.90
Silica cement, net ton (Eastern)	.....	9.00

Chrome Brick		Per Net Ton
Standard chemically bonded, Balt.,	.....	
Plymouth Meeting, Chester	.....	\$54.00

Magnesite Brick		
Standard, Balt. and Chester	.....	\$76.00
Chemically bonded, Baltimore	.....	65.00

Grain Magnesite		
Domestic, f.o.b. Balt. and Chester	.....	
in sacks (carloads)	.....	\$43.48
Domestic, f.o.b. Chewelah, Wash.	.....	
(in bulk)	.....	22.00

### RAILS, TRACK SUPPLIES (F.o.b. Mill)

Standard rails, heavier than 60 lb.	.....	
No. 1 O.H., gross ton	.....	\$40.00
Angle splice bars, 100 lb.	.....	2.70
(F.o.b. Basing Points)	.....	
Light rails (from billets)	.....	\$40.00
Light rails (from rail steel)	.....	39.00

Base per Lb.		
Cut spikes	.....	3.00c.
Screw spikes	.....	5.15c.
Tie plates, steel	.....	2.15c.
Tie plates, Pacific Coast	.....	2.30c.
Track bolts	.....	4.75c.
Track bolts, heat treated, to rail-	.....	
roads	.....	5.00c.
Track bolts, jobbers discount	.....	63-5
Basing points, light rails, Pittsburgh,	.....	
Chicago, Birmingham; cut spikes and tie	.....	
plates—Pittsburgh, Chicago, Portsmouth,	.....	
Ohio, Weirton, W. Va., St. Louis, Kansas	.....	
City, Minnequa, Colo., Birmingham and	.....	
Pacific Coast ports; tie plates alone—	.....	
Steelton, Pa., Buffalo, Cut spikes alone—	.....	
Youngstown, Lebanon, Pa., Richmond,	.....	
Oregon and Washington ports, add 25c.	.....	

### CORROSION AND HEAT- RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

#### Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

#### Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F. Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hot strip	17.00c.	17.50c.	24.00c.	35.00c.
Cold strip	22.00c.	22.50c.	32.00c.	52.00c.

#### Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

\*Includes annealing and pickling.

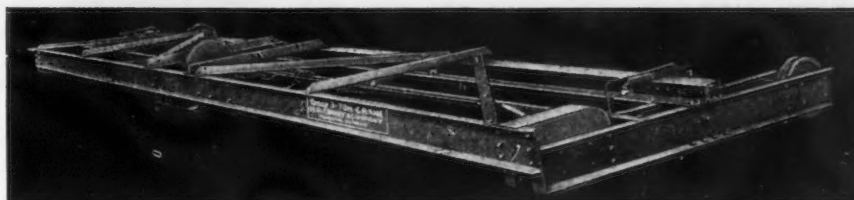
### ELECTRICAL SHEETS (Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.
F.o.b. Granite City, add 10c. per 100	
lb. on field grade to and including	
dynamo. Pacific ports add 75c. per 100	
lb. on all grades.	

# CONCO

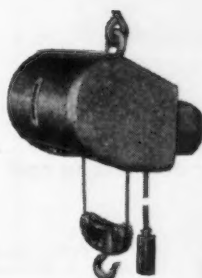
3-Motor Single Girder  
CAB OR FLOOR  
OPERATED

## ELECTRIC CRANE ...



Available in capacities of one through five tons for floor or cab operation. Simply, ruggedly designed for low first cost and maintenance. Used with Low Head-room Type Hoist, provides for maximum space coverage horizontally and vertically. Effective in even a minimum space. Write for Bulletin 2000.

Write for Bulletin 26000 describing the Torpedo Hoist shown. Three capacities 250 lb. — \$139.50, 500 lb. — \$149.50, 1000 lb. — \$159.50. Heavily, simply built, with Push Button Control. Outstanding in CONCO'S complete line of hand-powered and electric Cranes, Hoists, Trolleys.



## CONCO

ENGINEERING  
WORKS

H. U. Conkey & Co. — 15 Grove St. — Mendota, Ill.

**Builders Of Conco Torpedo Electric Hoist**

"Curls" ... we thought he was  
a hairdresser until we found he was from  
Brooklyn and meant "coils" in a spring.  
No matter how you say it, when you talk  
springs, you're talking our language and  
we'll get along great... without an interpreter  
... for we try to be

"Everybody's Spring Dept."



**DUNBAR**  
BROTHERS CO.  
DIV. OF ASSOCIATED SPRING CORP.  
BRISTOL, CONN.

SPRINGS • WIRE FORMS • SMALL STAMPINGS



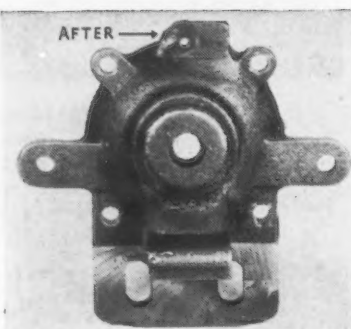
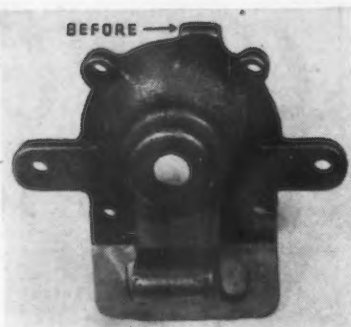
## This engineering change on a gray iron casting was a cinch!

Learn this conservation process—it may mean thousands of dollars to you.

**A** CHANGE in design after hundreds of these gray iron castings had been machined called for a wider lug to accommodate another hole. A small deposit of PHILLIPS "600" Electrode brought the lug to the required size—then the hole was drilled and tapped through the line of fusion. This job was done by a contract shop for 15¢ per casting.

Similar savings are made every day with PHILLIPS "600" Electrode, which produces fully machinable deposits on cast iron. The process has been used for years in hundreds of foundries and machine shops.

All details are explained in our free manual of procedures for arc welding cast iron. Write for your copy TODAY.



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**"HERCULES" (RED STRAND) WIRE ROPE**  
**For Low Operating Cost**

Round Strand  
Flattened Strand  
Standard & Preformed

**W**HY not let "HERCULES" (Red-Strand) Wire Rope help you meet present day production requirements and still maintain a reasonable margin of profit? You will quickly discover that "HERCULES" is a dependable ally—not only in today's fight against increasing operating costs—but also in your endeavor to speed up production.

Made Only By **A. LESCHEN & SONS ROPE CO.** Established 1857

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New York • Chicago • Denver • San Francisco • Seattle • Portland

## PRICES

### Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Bethlehem, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.  
Carload lots (bulk) ..... \$135.00  
Carload lots (packed) ..... 141.00  
Less ton lots (packed) ..... 148.50  
Premium, \$1.70 for each 1% above 82% Mn; penalty, \$1.70 for each 1% below 78%.

### Manganese Metal

Contract basis, lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Spot sales add 2c. per lb.  
96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.  
Carload, bulk ..... 36c.  
L.c.l. lots ..... 38c.  
95-97% Mn, .2% max. C, 1.5% max. Si, 2.5% max. Fe.  
Carload, bulk ..... 34c.  
L.c.l. lots ..... 35c.

### Spiegeleisen

Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.  
16-19% Mn 19-21% Mn  
3% max. Si 3% max. Si  
Carloads ..... \$35.00 \$36.00  
Less ton ..... 47.50 48.50

### Electric Ferrosilicon

OPA maximum base price cents per lb. contained Si, lump size in carlots, f.o.b. shipping point with freight allowed to destination.

	Eastern Zone	Central Zone	Western Zone
50% Si ....	6.65c.	7.10c.	7.25c.
75% Si ....	8.05c.	8.20c.	8.75c.
80-90% Si .	8.90c.	9.05c.	9.55c.
90-95% Si .	11.05c.	11.20c.	11.65c.
Spot sales add: .45c. per lb. for 50% Si, .3c. per lb. or 75% Si .25c. per lb. for 80-90% and 90-95% Si.			

### Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)  
F.o.b. Jackson, Ohio ..... \$29.50\*  
Buffalo ..... 30.75\*  
For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorus or over.  
\*OPA price established 6-24-41.

### Bessemer Ferrosilicon

Prices are \$1 a ton above silvery iron quotations of comparable analysis.

### Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe. 13.10c.	13.55c.	16.50c.	
97% Si, 1% Fe. 13.45c.	13.90c.	16.80c.	

### Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk 3.35c.	3.50c.	3.65c.	
2000 lb.-carload ..... 3.8c.	4.2c.	4.25c.	

### Silicomanganese

Contract basis lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Add .25c. for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.  
Carload, bulk ..... 6.05c.  
2000 lb. to carload ..... 6.70c.  
Under 2000 lb. .... 6.90c.  
Briquets, contract, basis carlots, bulk freight allowed, per lb.... 5.80c.  
2000 lb. to carload ..... 6.30c.  
Less ton lots ..... 6.55c.

### Ferrochrome

(65-72% Cr, 2% max. Si)  
OPA maximum base contract prices per lb. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .25c. per lb. contained Cr for spot sales.

	Eastern Zone	Central Zone	Western Zone
0.06% C ..... 23.00c.	23.40c.	24.00c.	
0.10% C ..... 22.50c.	22.90c.	23.50c.	
0.15% C ..... 22.00c.	22.40c.	23.00c.	
0.20% C ..... 21.50c.	21.90c.	22.50c.	
0.50% C ..... 21.00c.	21.40c.	22.00c.	
1.00% C ..... 20.50c.	20.90c.	21.50c.	
2.00% C ..... 19.50c.	19.90c.	21.00c.	
66-71% Cr, 4-10% C .... 13.00c.	13.40c.	14.00c.	



# PRICES

## Other Ferroalloys

Ferrotungsten, Standard grade, lump or 1/4X down, packed, f.o.b. plant at Niagara Falls, New York, Washington, Pa., York, Pa., per lb. contained tungsten, 10,000 lb. or more...	\$1.90
Ferrovanadium, 35-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. contained Va.	
Open Hearth .....	\$2.70
Crucible .....	\$2.80
Primus .....	\$2.90
Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal .....	\$1.50
Vanadium pentoxide, 88%-92% V <sub>2</sub> O <sub>5</sub> technical grade, contract basis, any quantity, per lb. contained V <sub>2</sub> O <sub>5</sub> . Spot sales add 5c. per lb. contained V <sub>2</sub> O <sub>5</sub> .....	\$1.10
Ferroboron, contract basis, 17.50% min. Bo, f.o.b. producer's plant with usual freight allowances, per lb. of alloy.	
2000 lb. to carload .....	\$1.20
Under 2000 lb. ....	1.30
Silicaz No. 3, contract basis, f.o.b. producer's plant with usual freight allowances, per lb. of alloy. (Pending OPA approval)	
Carload lots .....	25c.
2000 lb. to carload .....	26c.
Silvaz No. 3, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy (Pending OPA approval)	
Carload lots .....	58c.
2000 lb. to carload .....	59c.
Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis	
No. 1 .....	87.5c.
No. 6 .....	60c.
No. 79 .....	45c.
Bortram, f.o.b. Niagara Falls	
Ton lots, per lb. ....	45c.
Less ton lots, per lb. ....	50c.
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per lb. contained Cb.	
2000 lb. lots .....	\$2.25
Under 2000 lb. lots .....	\$2.30
Ferrotitanium, 40%-45%, f.o.b. 0.10c. max. Niagara Falls, N. Y., ton lots, per lb. contained Ti.	\$1.23
Less ton lots .....	\$1.25
Ferrotitanium, 20%-25%, 0.10 C max., ton lots, per lb. contained titanium .....	\$1.35
Less ton lots .....	\$1.40
High-carbon ferrotitanium, 15%-20%, 6%-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore and St. Louis, per carload .....	\$142.50
Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with \$3 unitage freight equaled with Rockdale, Tenn., per gross ton .....	\$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage freight equalized with Nashville, per gross ton .....	\$75.00
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per lb. contained Mo.	95c.
Calcium molybdate, 40%-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained Mo .....	80c.
Molybdenum oxide briquettes, 48%-52% Mo, f.o.b. Yangeloth, Pa., per lb. contained Mo .....	80c.
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per lb. contained Mo .....	80c.
Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. Add 1/4c. for spot sales	
Carload lots .....	14c.
Zirconium, 12-15%, contract basis, lump, f.o.b. plant usual freight allowances, per lb. of alloy	
Carload, bulk .....	4.6c.
Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk .....	5.75c.
Ton lots .....	7.25c.
Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb.	
Car lots .....	8.75c.
Ton lots .....	9.25c.

## BRONZE BEARINGS OILLESS BRONZE BEARINGS GEAR BLANKS MACHINED BRONZE PARTS

S & H Bronze Bearings can be furnished in any size or quantity to meet your particular requirements.

Our equipment and manufacturing methods enable us to meet the most exacting specifications and design.



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Machines and machine tools as well as men must measure up to MARINE CORP standards before acceptance . . . must be capable of handling whatever situation arises. That is why we are proud that SHELDON LATHES were selected for the Marine Trailerized Machine Shops as well as for the Army's "Mobile Machine Shop and Mobilized" Instrument Repair Shop Units, and as the maintenance lathes for many Navy craft.

Modern battle equipment requires precision machinery. Operation under battle conditions requires rugged, reliable and dependably accurate machine tools. In SHELDON Precision Lathes all of these requirements are fulfilled.

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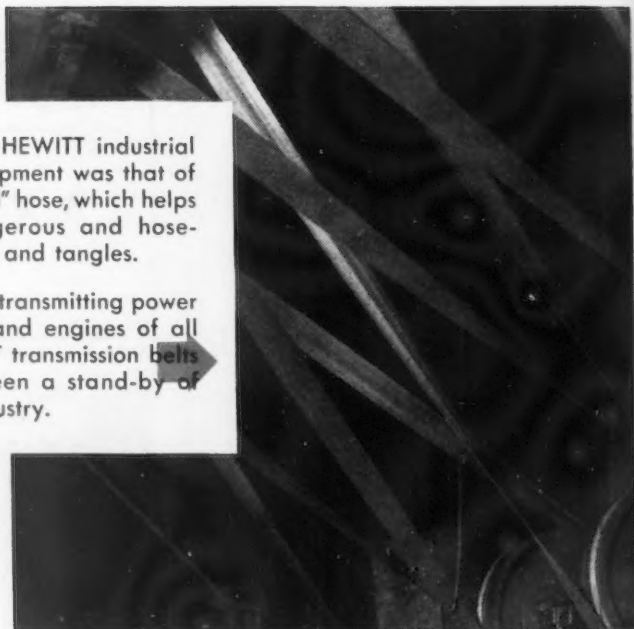
# RUBBER

for industry is our job...



An important HEWITT industrial rubber development was that of the "Twin-weld" hose, which helps prevent dangerous and hose-wearing kinks and tangles.

For efficiently transmitting power from motors and engines of all kinds, HEWITT transmission belts have long been a stand-by of American industry.



**F**OR almost a century, we at HEWITT have specialized in the production of industrial rubber products. In normal times that means principally hose, conveyor belts, transmission belts and packing. But today one of our most important jobs is supplying the aircraft industry with the famous self-sealing gasoline tanks that have

saved the lives of so many of our fighter pilots. Both in war times and in peace, HEWITT technicians are steadily working to originate new applications that make rubber of more value to industry. The same engineering skill that currently contributes to the perfection of the self-sealing gasoline cells—and in the past has introduced many important innovations, such as the use of synthetic rubber for oil and gasoline hose—is busily at work developing the even finer HEWITT industrial rubber products of the future.



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